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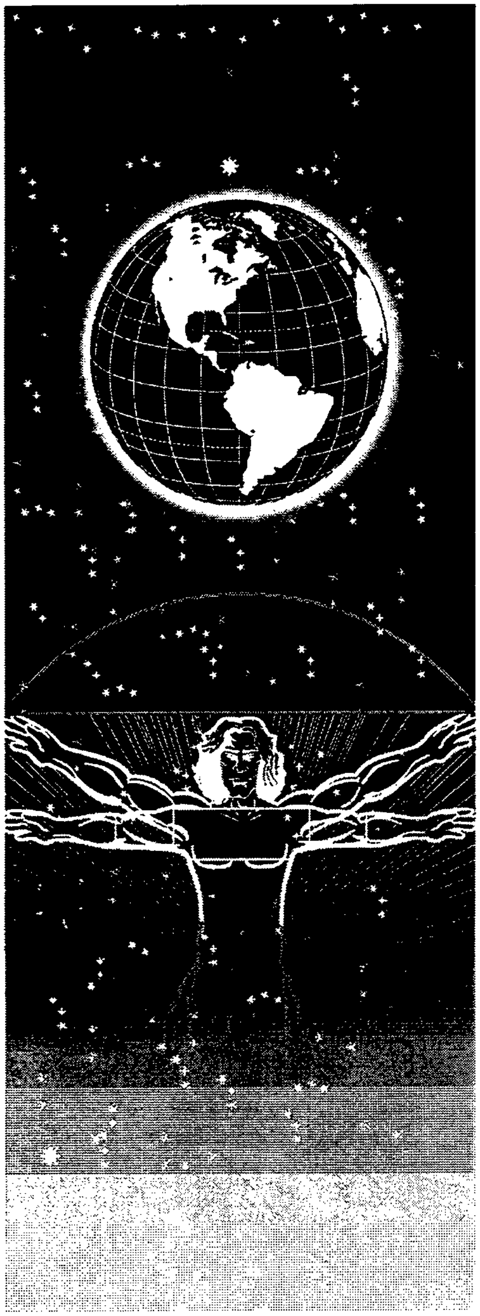

UNITED STATES AIR FORCE
ARMSTRONG LABORATORY

# Wake Island, United States Territory General Environmental Compliance Assessment and Wastewater Characterization Survey

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April 1998



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Wake Island is a territory of the United States and must comply with the US environmental regulations under the direct authority of Region IX of the EPA. Wake Island is a small community water system. Rain water is utilized as the primary potable water source. The wastewater effluent generated is of weak strength. The incinerator on the island is used to destroy light amounts of general food rubbish. The landfill and adjacent burn pit receive small but un-quantified amounts of domestic solid waste. Hazardous waste was actively being managed by the Hickam AFB environmental flight. The results of this wastewater characterization survey should be used to identify to the regulatory agency the significant findings from this survey and the subsequent environmental impact that the mission operations have on the island's ecosystem. Wake Island has never had a National Pollutant Discharge Elimination System (NPDES) permit for its waste water effluent at Peacock Point, this data should be reviewed to determine if Wake Island will be required to obtain a NPDES permit. Recommend that a septic system be procured and installed at lift station 9. A septic system would provide sufficient treatment to reduce the Oil & Grease concentrations and the oxygen demand loading on the receiving waters at Peacock Point. Recommend that the medical technicians initiate monitoring for pH, and chlorine residual during their routine bacteriological sampling. Positive bacteria results cannot identify the potential source of the problem without pH and chlorine residual monitoring, it was also identified that the island may experience supply shortfalls with its gaseous chlorine and had been without for extended periods of time. Recommend that civil engineering maintain an adequate supply of either household or swimming pool beach.

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## EXECUTIVE SUMMARY

Wake Island is a territory of the United States. As such, it is required to comply with the US environmental regulations under the direct authority of Region IX of the Environmental Protection Agency. The Department of Defense Overseas Environmental Baseline Guidance Document is applicable for all US military installations located outside the soils of the United States. In overseas locations where the DoD executive agent has negotiated with the host nation and drafted Final Governing Standards (FGS) for environmental compliance within that country, the FGS will supersede all other documents.

### General Assessment

Wake Island is a small community water system. Rainwater is utilized as the primary potable water source. The wastewater effluent generated is of weak strength. The incinerator on the island is used to destroy light amounts of general food rubbish. The landfill and adjacent burn pit receive small but un-quantified amounts of domestic solid waste. Hazardous waste was actively being managed by the Hickam AFB environmental flight.

The results of this waste water characterization survey should be used to identify to the regulatory agency the significant findings from this survey and the subsequent environmental impact that the mission operations have on the island's ecosystem. Since Wake Island has never had a National Pollutant Discharge Elimination System (NPDES) permit for its waste water effluent at Peacock Point, this data should be incorporated into the review for whether Wake Island will be required to obtain a NPDES permit.

Recommend that a septic system be procured and installed at lift station 9. A septic system would provide sufficient treatment to reduce the Oil & Grease concentrations and the oxygen demand loading on the receiving waters at Peacock Point.

Recommend that the medical technicians initiate monitoring for pH, and chlorine residual during their routine bacteriological sampling. Positive bacteria results can not identify the potential source of the problem without pH and chlorine residual monitoring.

It was also identified that the island may experience supply shortfalls with its gaseous chlorine and had been without for extended periods of time. Recommend that civil engineering maintain an adequate supply of either household bleach or swimming pool calcium hypochlorite (HTH) for emergency chlorination/disinfection requirements. Further recommend that if bleach is the material of choice, that stock levels be rotated through the base supply activity on the island. This will maintain freshness and strength of the household bleach.

## Compliance

Operational Compliance should reside with the agency responsible for generating the waste. At the time of the survey, the Department of the Army was maintaining operational control of all activities on the island. Therefore, the host Army installation supporting Wake Island should be providing oversight and management control on all active operations. The Army must be a responsible tenant for its operations so as to not further impact the ecological health of the real property assets or possible compliance status.

Historical Compliance. The Air Force is the holder of the real property assets for Wake Island and should initiate the programs to fully characterize and identify all the historical impacts on the island. At the time of the survey the Air Force held the real property assets through Hickam AFB. The identification of sites eligible under the Defense Environmental Restoration Act (DERA) and the Installation Restoration Program (IRP) should be programmed and managed through the Air Force. After being programmed, the Air Force and the Army may elect to negotiate the possibility of transferring the restoration programs and real property accounts.

# WAKE ISLAND, UNITED STATES TERRITORY

## GENERAL ENVIRONMENTAL COMPLIANCE ASSESSMENT

## AND

## WASTEWATER CHARACTERIZATION SURVEY

# INTRODUCTION

Personnel from the Water Quality Branch of Armstrong's Laboratory's Bioenvironmental Engineering Division (AL/OEBW), Captain Jeffrey Gillen, Senior Consultant Engineer, and MSgt Doris Dohner performed a wastewater characterization survey at Wake Island, United States Territory, during the week of 30 August to 4 September 1996. This survey was requested by the Environmental Flight, 15th Civil Engineering Squadron, Hickam Air Force Base, Hawaii.

The primary goals of this survey were to:

1. Provide a general environmental compliance assessment of the other processes on Wake Island that may be subject to environmental regulatory oversight.
2. Determine the regulatory jurisdiction authority under which Wake Island Territory and its facilities are subject.
3. Determine who has the responsibility for complying with standards.
4. Determine compliance with the Clean Water Act.
5. Assess the sanitary sewer system, determine if the system requires repair or replacement.
6. Characterize the wastewater flowing into the ocean and identify possible sources of pollution.

# DISCUSSION

### Background

Wake Island is a territorial island of the United States, located in the Pacific Ocean, approximately two-thirds of the distance from Hawaii to the Northern Mariana Islands. Historically, the US military used Wake Island to support aerospace mission requirements as a refueling station and layover destination in the Pacific Ocean. In 1992, the Air Force placed the facility into caretaker status and removed all mission requirements from the facility.

At the time of this survey the real property assets of Wake Island were the responsibility of the US Air Force. Hickam AFB, Hawaii maintains the records for the island. The US Army Space and Strategic Defense Command (USASSDC) is now the sole military occupant and the command authority directly responsible for all the mission activities. The primary mission of the USASSDC is to test and evaluate ballistic missile defense systems. In June 1996, the Missile Launch Facility accomplished their first missile launch from the Wake Island Complex.

The current island population is approximately 150 permanent personnel. The US Army maintains Wake Island in an advanced form of caretaker status. Mr. Paul Fusco is the Island Commander and the only federal Department of Defense employee. The operations and maintenance functions are performed under an Army contract with the Chugash Development Corporation (CDC). CDC employs appropriately 100 Thailand nationals to perform routine Operation & Maintenance (O&M) support functions on the island. CDC management and support staff of approximately 15 people, maintain the air and ground military operations functions. The remaining personnel on the island are army contractors building up the missile test launch facility. During army launch activities, the island population doubles to approximately 300 personnel.

## General Compliance Assessment

### Compliance Authority

Wake Island is a territory of the United States and as such is responsible to comply with all the environmental laws and regulations as any other state or territory. The U.S. Environmental Protection Agency (EPA) Region IX, located in San Francisco, CA is responsible for ensuring compliance. When the Air Force drew down the facility, they also shipped any and all administrative records back to Hickam AFB for archival staging or incorporation into program management. After interviewing personnel from the Hickam AFB environmental office and Mr Fusco, no historical environmental permits for Wake Island were known to have existed for any environmental operation or program. Wake Island is not eligible to be managed under the Department of Defense's *"Overseas Environmental Baseline Guidance Document"* (OEBGD) due to Wake Island's status as a US territory. Wake Island's status is the same as the island of Guam, which is also a US territory and Region IX is the responsible regulatory authority for its compliance programs.

The discussion contained herein will describe the general condition of each major environmental program observed during the period of the survey. These programs may require further assessments or evaluations by the owning/responsible service component (US Air Force or Army).

## Air Quality

Wake Island has a few sources that may require permitting under the Clean Air Act. The first source is a small, two stage incinerator located near the civil engineering complex and flightline POL storage area. The incinerator was observed processing aluminum cans and food preparation wastes. Adjacent to the landfill cell, near Peacock Point, open burning of tree trimmings, waste lumber, and other construction materials is conducted in a burn pit (see below). There is a large POL staging area on Wilkes Island near the POW rock. Aircraft and flight-line operations are limited to transient aircraft, no aircraft are assigned to Wake Island. The Army's test mission involves the live firing of missile systems and is the major contributor to any air quality impacts. Civil Engineering maintenance activities are very minor.

**Figure 1. Incinerator**

## Solid Waste

The landfill and burn pit are located near Peacock Point. The landfill receives domestic refuse from the housing and light industrial areas on the island. The landfill was not covered daily due to a lack of available cover material. The burn pit is located immediately adjacent to the landfill cell and had an abundance of tree and shrubbery waste. Mr. Fusco reported that the burn pit normally burns only once a week. Throughout the survey, several wild (domestic) cats were observed scavenging for food at these locations. No daily record was being kept as to the location or nature of the specific wastes being placed in the landfill.

## Hazardous Waste

Officials from Hickam AFB and Wake Island have been very active in establishing and managing their hazardous waste program. Capt Joel Almosara, hazardous waste consultant engineer from Armstrong Laboratory, has made numerous trips to establish, characterize, and coordinate the proper shipment and disposition of hazardous waste. Transportation problems may hamper the timeliness of shipping hazardous waste off the island within the required 90 day requirement.

## Water Quality

### Water Distribution Systems

Wake Island has two distinct water distribution systems. The potable "fresh" water system is used for consumption, bathing, and food preparation requirements. The other system is a "brackish" (saline) water distribution system used for flushing toilets and other non-potable requirements.

**Figure 2. Rainwater Catchment Basin**

Wake Island has two methods for obtaining fresh water for potable purposes: collecting and treating rainwater and the desalinization of brackish ground water. The rainwater collection system is the primary source of potable water. The rainwater system utilizes two, nine acre asphalt catchment basins. These basins are designed to collect rainwater and transport it to the water treatment plant. The rainwater undergoes treatment processes of rapid sand filtration, chlorination, and diatomaceous earth filtration prior to storage.

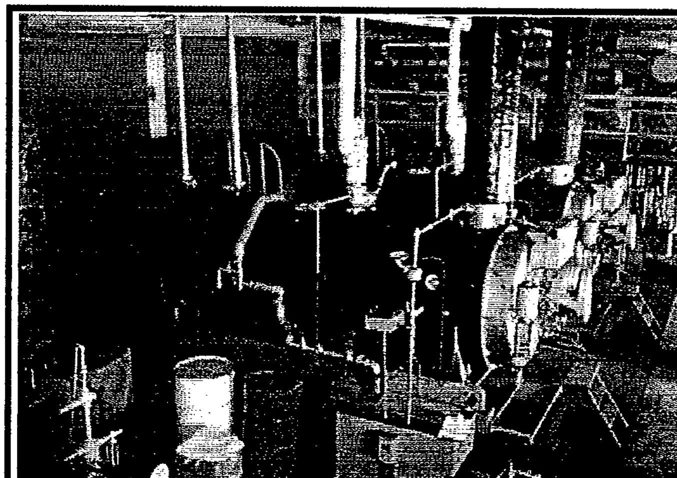


**Figure 3. Desalinization Plant**

Wake Island has eight above ground storage water tanks with a storage capacity of 11 million gallons. Six concrete tanks and two metal tanks provide sufficient potable water storage capacity for the island population. All eight tanks are experiencing significant surface and structural degradation due to the environmental chemistry of the ocean (salt) air and the tank surfaces.

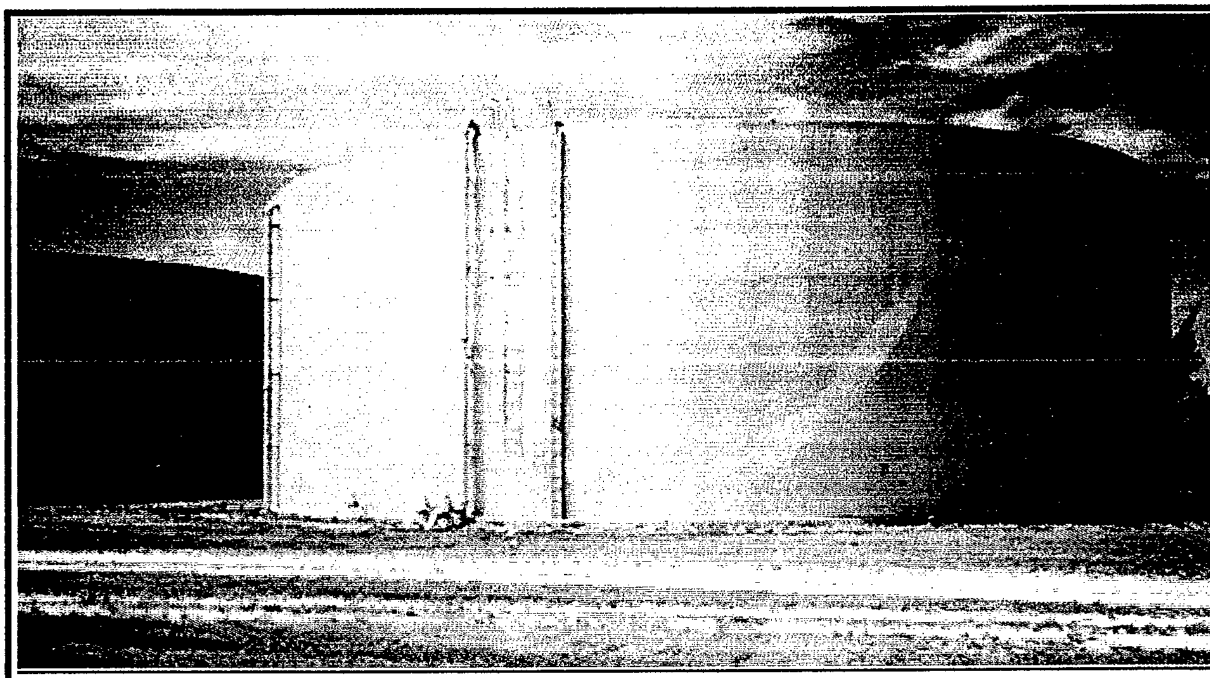


**Figure 4. Steel Water Storage Tank**

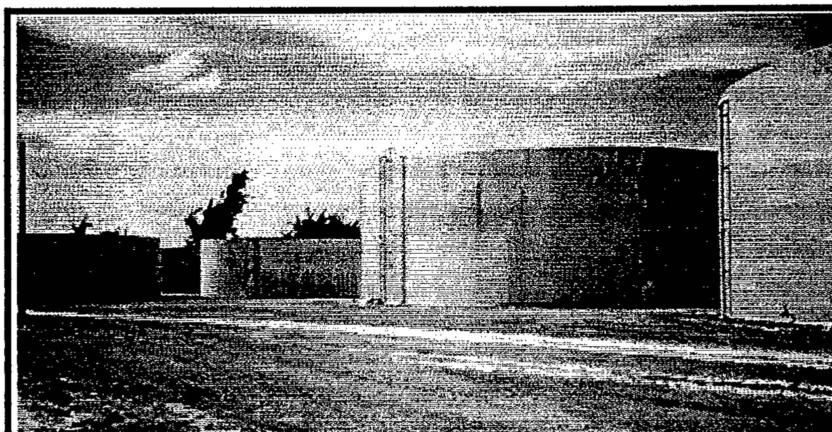


**Figure 5. Above Ground Water Storage**

Upon demand from the distribution system, water is supplied from the bulk storage tanks, through post chlorination stage (which re-supplies chlorine residual levels) to one of three pressurized distribution loops on the island. The backup mechanism capable of producing fresh drinking water is a large antiquated desalinization water treatment plant. There are three ground water wells adjacent to the water treatment plant that supplies brackish water. The plant appears to be exceptionally maintained but not operationally utilized. This decision is driven by operational economics, such as the high power requirements and maintenance costs. When comparing desalinization to rainwater treatment, desalinization is much more expensive. Recommend initiating quarterly operational water production with the desalinization plant. This will assist in keeping the system on-

line for emergency potable water production. Boosting stations maintain adequate pressure in the potable water lines and also provide 200,000 gallons of surge storage supply capacity on each distribution loop. The boosting stations also house a separate pressurized system for non-potable requirements using brackish water. Brackish wells are located at the boosting stations and provide water directly to another surge supply tank (200k gal). The supply water from the surge tanks is fed to the main pumps which pressurize a large storage tank connected to the distribution system. These boosting pump stations are automatically operated and provide sufficient pressure to their respective distribution zones.

There is a minor potential for cross-contamination during water main repair and replacement between the brackish and potable distribution systems. System integrity can be maintained by pressure testing and monitoring each system. Also, the CDC water plant operators and plumbers are very knowledgeable about the water systems and its infrastructure, thus further minimizing the potential for cross-connections.

The pressure distribution loop with the highest demand is in the community area near building 1103, servicing the dining facility, billeting dormitories, the bowling alley, and the Drifters Reef Bar and Grill. The other pressure boosting loops are located across the street from the industrial work area and near the water treatment plant.

**Monitoring**

The water system operators monitor the chlorine residual, pH, and the pressure on both the freshwater and brackish water distribution systems and the amount of water in the their respective pressurized storage tanks.

Two medical technicians assigned to the clinic collect water and ice machine samples for public health surveillance. The samples are analyzed for E-coli. They use the HACH presence/absence bacteriological method. Since the plumbers are checking the chlorine residual and pH levels throughout the distribution system, the medical technicians were not checking the pH and chlorine residual as part of their drinking water surveillance program. It appears that the medical technician's have established an otherwise outstanding drinking water quality surveillance program and can identify and immediately recommend corrective actions on most health related drinking water quality issues or problems.

Recommend that the medical technicians initiate monitoring for pH, and chlorine residual during their routine bacteriological sampling. Positive bacteria results can not identify the potential source of the problem without pH and chlorine residual monitoring. It was also identified that the island may experience supply shortfalls with its gaseous chlorine and have been without for extended periods of time. Recommend that civil engineering maintain an adequate supply of either household bleach or swimming pool calcium hypochlorite (HTH) for emergent chlorination/disinfection requirements. Further recommend that if bleach is the material of choice, that stock levels be rotated through the base supply activity on the island. This will maintain freshness and strength of the household bleach.

# Infrastructure

## Corrosion

The facilities on Wake Island are directly exposed to a severely corrosive environment. The salt-water spray from the ocean and other ambient environmental conditions are highly corrosive on the infrastructure (piping and structures) of both the water distribution and wastewater collection systems. Metal objects, such as manholes and fire hydrants, are severely corroded. The cover on the sanitary sewer system manhole at Peacock Point is so severely corroded that it is effectively welded shut, and the foundry detail on the cover crumbles and flakes off with little effort. Concrete structures, such as the lift stations, ground storage tanks, and telephone/power poles, are deteriorating to the point of structural failure.

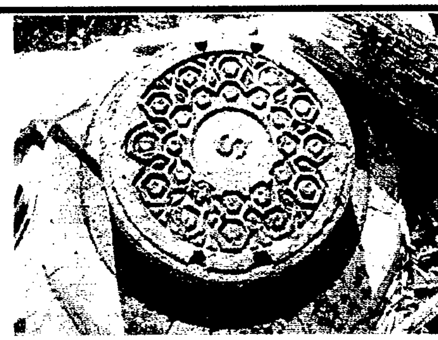


**Figure 6. Corroded Manhole**

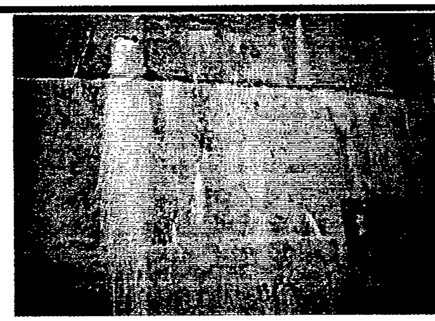


**Figure 7. Water Tank Corrosion**

## Wastewater Collection System

Wastewater is collected via a common sanitary sewer system. Therefore, the wastewater on Wake Island is a mixture of traditional domestic and industrial wastes with a higher level of salinity due to the brackish non-potable make-up water (see figure 8 for diagram).

The wastewater collection system on Wake Island consists of a gravity system with ten lift stations. The wastewater flows sequentially through the lift stations before flowing through the remnants of a sewage treatment plant and finally discharging the effluent into the Pacific Ocean at Peacock Point. Peacock Point is the southeastern most location on the island.

All the lift stations are designed with two pumps in parallel, with automatic float controls and manual backup pump control systems. At the time of the survey, the majority of the lift stations were being operated on only one pump. The automatic systems were inoperable at lift stations 9 and 1 requiring manual operation. The main

lift stations are all located on the northerly side of the island collecting wastewater from their respective zones.

Lift stations number 9 and 1 are manually operated. High and low level float sensors automatically operate the other lift stations. Once a day, Monday through Saturday, the water system operators manually turn on the pumps at Lift Stations 9 and 1. Station 9 and 1 operate approximately 45 minutes and 10 minutes, respectively, to pump down their holding reservoirs. It takes approximately two hours for the slug of sewage to travel by gravity through the remaining lift stations and an additional 30 to 40 minutes to travel to the wastewater treatment plant from Lift Station 1(see figure 8 for diagram).

Each of the lift stations has been designed with an overflow safety feature. In the event of an emergency or equipment failure, the overflow piping systems allow excess raw sewage to flow into a leachfield. The leachfields were reported as being underground conduits leading toward the adjacent shoreline. After closer inspection, it appears that the leachfields were actually overflow piping systems that directly transmit the raw sewage to the ocean.

The survey accomplished by USACHPPM(PROV) in May 1995 compared the results of their Water Quality Monitoring and Sanitary Survey to the Department of Defense Overseas Environmental Baseline Guidance Document (OEBGD), dated October 1992. Since Wake Island is a Territory of the United States, any standards or regulatory requirements should be compared with those established and regulated by EPA Region IX.

**Compliance**

The results of the wastewater characterization survey of this report should be used to identify to the regulatory agency the significant findings from this survey and the subsequent impacts that mission operations have on the island's ecosystem. Since Wake Island has never had a National Pollutant Discharge Elimination System (NPDES) permit for its wastewater effluent at Peacock Point, this survey data should be incorporated into the baseline data required for Wake Island's NPDES permit application.

A NPDES permit is typically required for all outfalls that discharge to the ocean unless the permitting authority, Region IX, has determined that a permit is not in the interest of the public and will not result in the "unreasonable degradation of the marine environment" (footnote Swidler & Berlin 1996). Unreasonable degradation is defined according to three specific criteria:

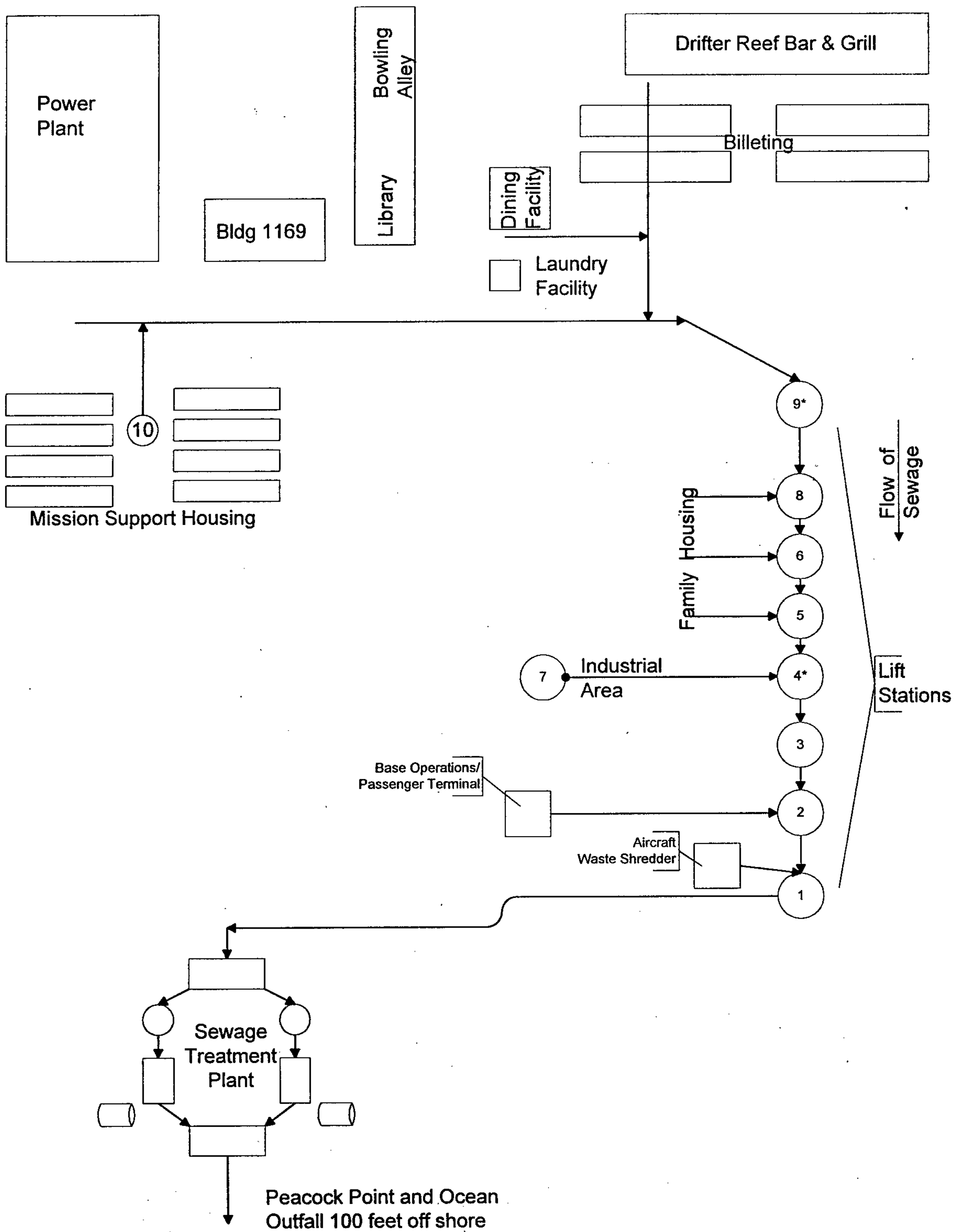



**Figure 8. Wastewater Flow Diagram**

1) significant change in the diversity, productivity, and stability of the ecosystem at the outfall.

2) threat to human health from direct exposure to pollutants or by consuming exposed marine life.

3) Aesthetic, recreational, economic, or scientific losses that may be considered unreasonable when contrasted to the benefit of discharging effluent through the outfall.

Untreated effluent outfalls discharging to the ocean, territorial seas, and waters of the United States are typically not allowed, because the discharge will alter reef and coral ecosystems through nutrient loading and oxygen demand. Therefore, EPA Region IX overseeing Wake Island's compliance status will need to determine whether the local impact on the marine ecosystem is significant in terms of the Clean Water Act.

The Water Quality Branch recommends that primary treatment processes be incorporated into the current wastewater collection system to reduce the oxygen demand and nutrient loading of the wastewater entering the ocean. In order of preference, recommend the following options:

1) Installing septic tanks prior to Lift Station 9 & 4. The septic tanks should be established with biological organisms capable of surviving in a brackish water environment. This option is the most advantageous as manpower, overall cost, and maintenance requirements are minimized.

2) Establish a natural surface treatment (wetlands) system. A series of small lagoons could be established to allow sufficient reaction time for biological activity to establish and maintain itself and treat the wastewater. This option may result in zero discharge of the treated effluent.

The wetland option could be used in conjunction with or in lieu of the septic tank system. The effluent from either of these options could then be sent on to Peacock Point or re-utilized and land applied to the golf course area.

3) Refurbishing the treatment works or installing a package wastewater treatment system at Peacock Point. This is the most expensive alternative in all functional requirements of manpower, maintenance, and operating costs.

## Wastewater Characterization Survey

The results of this wastewater characterization survey should be used to identify to the regulatory agency the significant findings from this survey and the subsequent environmental impact that the mission operations have on the island's ecosystem. Since Wake Island has never had a National Pollutant Discharge Elimination System

(NPDES) permit for its wastewater effluent at Peacock Point, this data should be incorporated into the review for whether Wake Island will be required to obtain a NPDES permit.

## Sampling Strategy

Based on the general layout of the lift stations, and the potential for contamination of domestic and industrial waste streams, Captain Gillen selected four sampling locations for the wastewater characterization survey. The chosen sampling locations will adequately characterize the base sewage and identify wastewater contributions from the industrial and domestic operations. Table 1, identifies the sampling sites chosen for this survey.

Composite samplers were installed at each of the first four sampling points. The samplers at sites 1, 2 and 4 were set to collect 125 ml sample every 20 minutes during a 24 hour time period. The sampler at Site #3 was programmed to sample 100 ml every 30 minutes during a 24 hour time period. The sample aliquots were collected in a single 3 gallon glass container chilled with ice. At the end of each 24 hour period, the composite sample was stirred and samples split into their respective containers for laboratory analyses. This sampling method provides a comprehensive picture of that specific day's activities. The analyses performed at each sampling location were tailored specifically to the anticipated effluent characteristic associated with activities contributing to that waste stream. All sample locations were analyzed for Chemical Oxygen Demand (COD). Table 2 summarizes the analyses conducted at each of the sampling points.

### TABLE 1. SAMPLING LOCATION DESCRIPTIONS

| SITE NUMBER AND LOCATION | DESCRIPTION/CONTRIBUTING OPERATIONS |
|---|---|
| SITE 1: Wastewater Treatment Plant | Skimming Tank A, located immediately after sewer manhole 45B. Receives all of island's wastewater, before following into the Pacific Ocean sewage outfall. |
| SITE 2: Sewage Lift Station #1, building 100 | Sewage lift station number one receives all of islands wastewater, including the wastewater from the passenger terminal and transient aircraft sewage disposal facility. This lift station pumps into the wastewater treatment plant. |
| SITE 3: Sewage Lift Station #4, building 500 | This lift station receives wastewater from the small industrial workshop areas. This also receives wastewater from two of the small housing areas on the island |
| SITE 4: Sewage Lift Station # 9, building 1038 | Sewage lift station receives the majority of the domestic sewage wastewater. Sewage from lift station #10 flows into this station. Wastewater from transient billeting, contractor billeting, dining facility and laundry facility flow into this pump station. |
| SITE 5: Lead & Copper Sample, building 1169 | Sample collected out of faucet of non bathroom water faucet. |
| POTABLE WATER SOURCE, building 1104, background sample | A water faucet in Wake Island's Dining Facility was selected for the potable water source sample. The faucet was located in the main kitchen area, near the soup preparation area. |
| SITE 6: Brackish Water Source, building 1103, background sample | The brackish water station for the community area is located near building 1103. The samples were collected directly from a spigot off the brackish water storage tank. |

## TABLE 2. ANALYSES SUMMARY

| SITE AND LOCATION AND SAMPLE TYPE | ANALYSES PERFORMED |
|---|---|
| SITE 1: Wastewater Treatment Plant<br>24 Hr. Composite, 4 Days | • VOCS/SVOC (EPA 601/602/624),<br>• COD,<br>• Oil & Grease, TPH,<br>• Ammonia,<br>• Kjeldahl Nitrogen, Nitrate/Nitrite,<br>• Cyanide<br>• Phenols,<br>• Metals (EPA 200.7),<br>• Chloride, Bromide, Total Reside, Filterable Residue (TDS), Nonfilterable Residue (TSS) EPA 608, 624, 615 & 625 |
| SITE 2: Pump/Lift Station 1<br>24 Hr. Composite, 4 Days | • Same as site 1 |
| SITE 3: Pump/Lift Station 4<br>24 Hr. Composite, 4 Days | • Same as site 1 |
| SITE 4: Pump/Lift Station<br>24 Hr. Composite, 4 Days | • Same as site 1 |
| SITE 5: Potable Water<br>Wake Island Dining Facility | • Same as site 1 |
| SITE 6: Brackish Water | • Same as site 1 |
| Bldg 1169: Visiting Quarters | • Lead and Copper (EPA 200.7) |

The chemical oxygen demand (COD) characterizes the strength of the wastewater. COD measurements are commonly utilized to estimate the biological oxygen demand (BOD) strength of a waste stream. BOD correlates the impact a waste stream has on the dissolved oxygen levels in the receiving water. High strength (COD) wastes may create an anaerobic environment in the receiving water thus impacting marine life. For instance, high BOD loads have caused fish kills or killed microbiological populations in receiving waters. Due to strict holding times and difficulties in shipping, BOD samples are commonly done with local laboratories or estimated from COD results. COD measurements are often correlated as being twice

the biological oxygen demand of a waste. Therefore, waste specific BOD concentrations can be estimated from the measured COD concentrations and range from 20 to 80%.

The survey team established a temporary laboratory and office in building 1169. This location provided the team excellent support with access to sufficient refrigeration, ice, freezers, desktop space for sample preservation, and sinks for sample container decontamination. Building 1169 is located in the community area of the island.

## Quality Assurance/Quality Control

During this survey a field QA/QC program was utilized that will assist in ensuring the analytical results received are accurate, precise, and reliable. Therefore, the engineering conclusions and recommendations that will utilize these results are valid and competent. Specifically, during the course of the survey. the following QA/QC procedural samples were utilized: equipment blanks, spikes, duplicates, and reagent blank samples. Quality Assurance / Quality Control (QA/QC) protocols are necessary components of a quality environmental survey. QA/QC programs are designed to eliminate, minimize and detect errors involved with obtaining reproducible, accurate, high quality analytical results.

### Equipment Blank Samples

This sampling series serves as a check of the contamination introduced due to sampling collection methods and sampling media. Drawing laboratory grade water through the sampling collection system (pitcher, sampler, etc.) into the appropriate sample container similarly to an actual sample collected in the field collected equipment blank samples. Preservation, refrigeration, packing and shipping were conducted in exactly the same manner as actual samples collected in the field.

### Spike Samples

This series of samples, in conjunction with the laboratory's (AL/OEA) QA/QC check the laboratory analysis procedures, and the reproducibility of the analytical results. Filling sample containers with a laboratory prepared known concentration, spiked standard solution, and collected spike samples. The spiked standard solutions were prepared by Armstrong Laboratory Analytical Service Division (AL/OEA) Quality Assurance / Quality Control Branch.

### Duplicate Samples

Duplicate samples serve to measure the precision of the laboratory to reproduce statistically similar results of a sample that has been equally divided or collected from the same source, and analyzed independently. The precision in which

the two laboratory results agree determine whether procedural error has been encountered at one of the laboratories. Precision is the statistical agreement between a set of replicate measurements without assumption or knowledge of the true measured value.

**Reagent and Trip Blanks Sample**

Reagent blank samples ensure the purity of the preservation reagents and to eliminate contributing factors resulting in false analytical results. Filling sample containers with laboratory grade water and preserving the sample in a similar manner as the other samples were preserved collected reagent blanks.

**Potable and Brackish Water Samples**

Background samples were collected to determine the treated water quality of the brackish and potable make up water entering the sanitary sewer collection system at Wake Island.

## Sample Results

**Water Quality Standards**

Wake Island is a United States Territory and the Overseas Environmental Baseline Governing Document standard does not directly apply to Wake Island. Wake Island falls under the Environmental Protection Agency (EPA) Region IX jurisdiction. The pollutant concentrations from each sample location can be compared to the make-up water source characteristics. These comparisons will facilitate a review by the regulatory agency to determine the environmental significance specific to permitting of the effluent discharge. The wastewater characteristics are compared to Metcalf and Eddy Wastewater Engineering's Typical composition of untreated domestic wastewater (See Table 1 below).

**Potable Water Dining Facility Building**

The potable water COD was measured at 21 mg/L, chloride level was 140 mg/L, total residue was 197, TDS was 161 mg/L, and TSS was 3 mg/L. Volatile organic compounds were measured in the potable water sample; bromodichloromethane was 15.9 µg/L, chlorodiobromomethane was 1.1 µg/L and chloroform 110 µg/L. Total trihalomethane were measured at 152 µg/L, this exceeds total trihalomethane Maximum Contamination Level (MCL) of 100 µg/L. Trihalomethanes are disinfection byproducts resulting from the chemical reaction between organic contaminants in the water and the chlorine disinfectant used to kill the contaminants (Viessman, 1985). Appendix G contains the analytical results of the potable water supply at the dining hall.

## Brackish Water System

The chemical oxygen demand (COD) in the brackish water was 485 mg/L. Chloride contained in the brackish water was 15010 mg/L, total residue measured was 37702 mg/L, TDS was 29875 mg/L and TSS was 96 mg/L. All volatile organic compounds were measured at <5 µg/L. Overall, the brackish water source contributes a large portion of the total Chemical Oxygen Demand (COD), chloride, total residue, total dissolved solids (TDS) and total suspended solids (TSS) in all of the wastewater samples. (see Appendix H)

## Typical Composition of Untreated Domestic Wastewater

Chloride sample results ranged from 5390 mg/L (31 Aug 96) to 9340 mg/L (3 Sept 96). Total solid residue ranged from 16100 mg/L (31 Aug 96) to 21472 mg/L (2 Sept 96). TDS ranged from 10345 mg/L (31 Aug 96) to 16572 mg/L (3 Sept 96). These measured components of this wastewater would characterize this wastewater concentration as strong. COD levels ranged from 100 mg/L (1 Sept 96) to 300 mg/L (2 Sept 96). Oil and grease levels ranged from 1.4 mg/L (3 Sept 96) to 9.2 mg/L (2 Sept 96). Ammonia levels ranged from 8.4 mg/L (3 Sept 96) to 18.2 mg/L (31 Aug 96). TSS ranged from 138 mg/L (3 Sept 96) to 295 mg/L (2 Sept 96). Volatile organic compounds were <5 µg/L, except Chloroform was 10.6 µg/L on 31 Aug 96 . These components indicate the untreated wastewater concentration range from weak to medium concentration. (see Appendix F)

## Lead and Copper Building 1169

In February of 1995 The U.S. Army Center for Health Promotion and Preventative Medicine (USACHPPM) accomplished lead a copper analysis of the drinking water. Some of these exceeded the lead action level of 15 µg/L. A sample of water from building 1169 was collected to measure the lead and copper in the drinking water. The water sample contained 0.233 mg/L of copper and 14 µg/L of lead. The amount of lead measured in this water sample was below the lead action level of 15 µg/L. (see Appendix I)

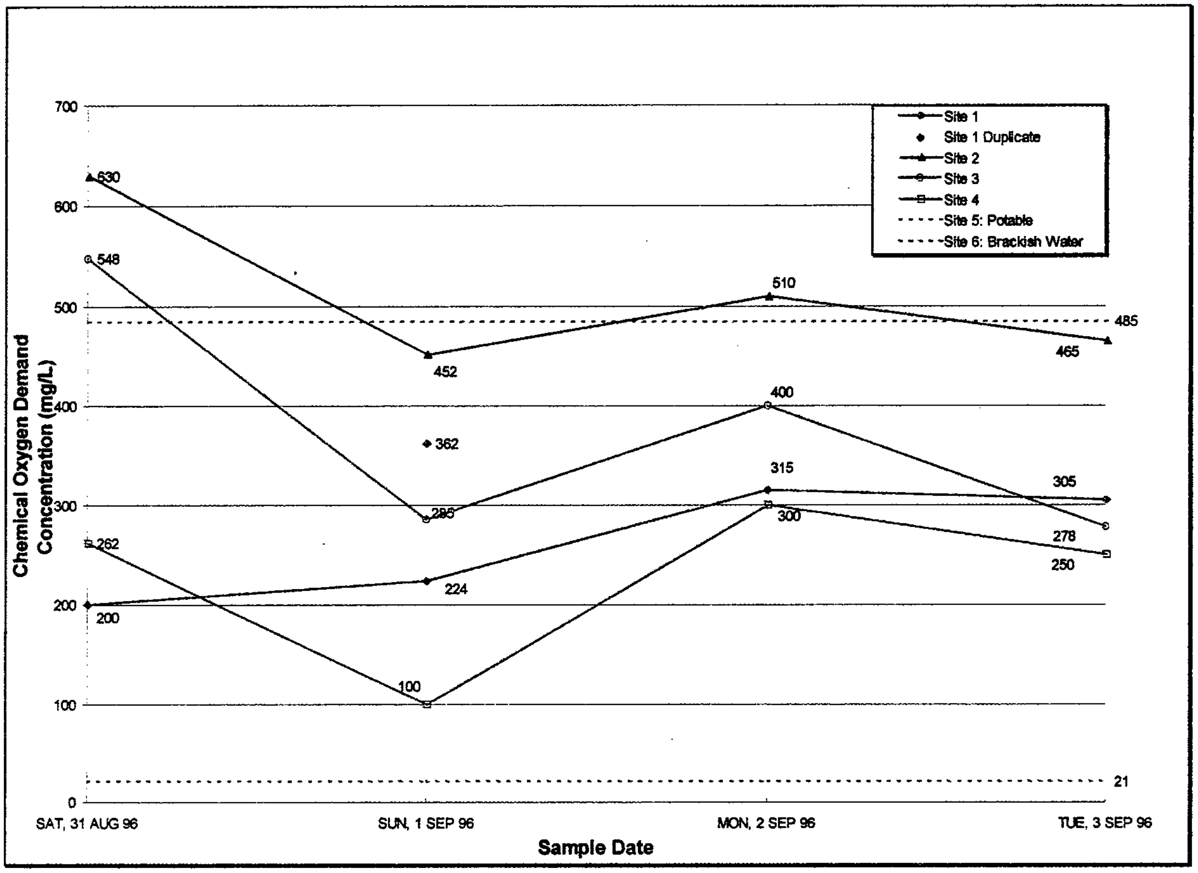



Figure 9. Chemical Oxygen Demand

## Chemical Oxygen Demand (COD)

The wastewater loading of chemical oxygen demand is compared to the source waters that supply the system. As illustrated in the figure 1, the COD of the brackish water was measured at 485 mg/l on 31 Aug 96. This is at or below the measured values for the majority of the sites with the exception of Site 2 and 3 on the first day of the survey. The effluent being discharged to Peacock Point is well below the COD of the receiving ocean water. The potable water sample had a measurable COD of 21 mg/l.

## TABLE 3
## TYPICAL COMPOSITION OF UNTREATED DOMESTIC WASTEWATER*

| CONTAMINANTS | UNIT | CONCENTRATION | | |
|---|---|---|---|---|
| | | WEAK | MEDIUM | STRONG |
| Solids, total (TS) | mg/l | 350 | 720 | 1200 |
| Dissolved, total (TDS) | mg/l | 250 | 500 | 850 |
| Fixed | mg/l | 145 | 300 | 525 |
| Volatile | mg/l | 105 | 200 | 325 |
| Suspended solids (SS) | mg/l | 100 | 220 | 350 |
| Fixed | mg/l | 20 | 55 | 75 |
| Volatile | mg/l | 80 | 165 | 275 |
| | | | | |
| Settleable solids | mg/l | 5 | 10 | 20 |
| | | | | |
| Biochemical oxygen demand | mg/l | 110 | 220 | 400 |
| $BOD_5$, 20°C | | | | |
| | | | | |
| Total organic carbon (TOC) | mg/l | 80 | 160 | 290 |
| | | | | |
| Chemical oxygen demand (COD) | mg/l | 250 | 500 | 1000 |
| | | | | |
| Nitrogen (total as N) | mg/l | 20 | 40 | 85 |
| Organic | mg/l | 8 | 15 | 35 |
| Free ammonia | mg/l | 12 | 25 | 50 |
| Nitrites | mg/l | 0 | 0 | 0 |
| Nitrates | mg/l | 0 | 0 | 0 |
| | | | | |
| Phosphorus (total as P) | mg/l | 4 | 8 | 15 |
| Organic | mg/l | 1 | 3 | 5 |
| Inorganic | mg/l | 3 | 5 | 10 |
| | | | | |
| Chlorides | mg/l | 30 | 50 | 100 |
| | | | | |
| Sulfate | mg/l | 20 | 30 | 50 |
| | | | | |
| Alkalinity (as $CaCO_3$) | mg/l | 50 | 100 | 200 |
| | | | | |
| Grease | mg/l | 50 | 100 | 150 |
| | | | | |
| Total Coliform | number /100 ml | $10^6$ - $10^7$ | $10^7$ - $10^8$ | $10^7$ - $10^9$ |
| Volatile organic compounds (VOCs) | µg/l | <100 | 100-400 | >400 |

*Metcalf and Eddy, Wastewater Engineering - Treatment, Disposal, Reuse.

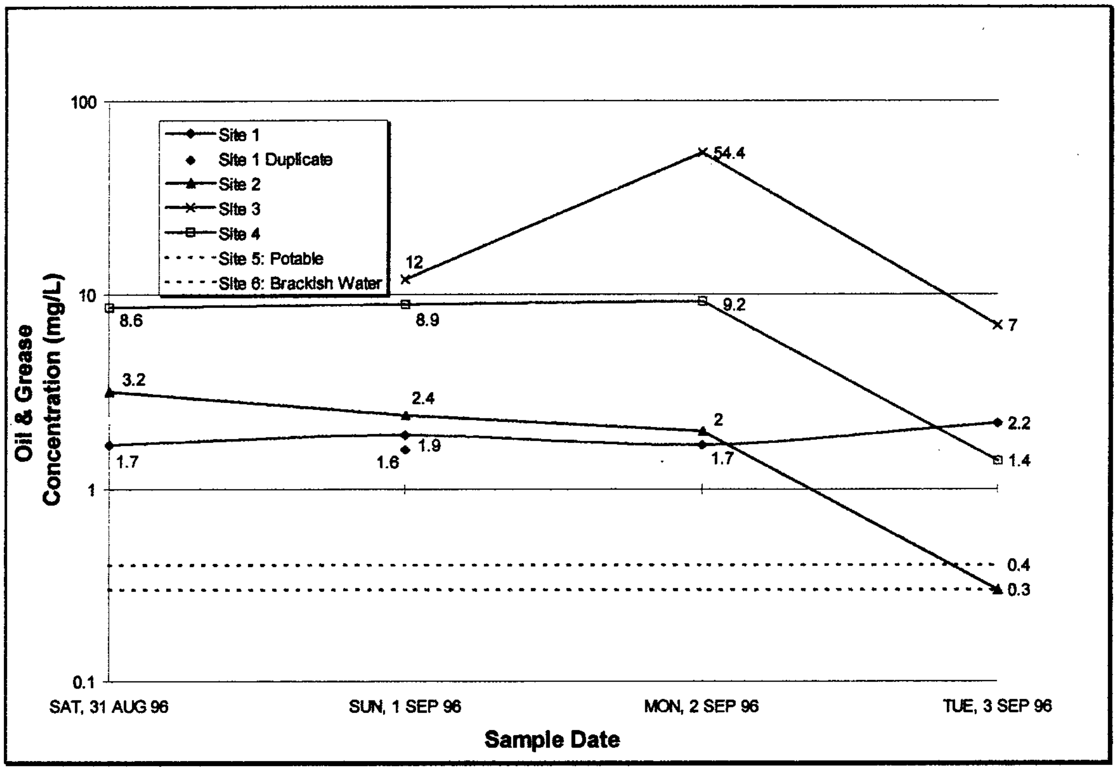



Figure 10. Oil & Grease

## Oil and Grease

The oil and grease concentrations in the wastewater were significantly higher than the source waters that supply the system. As illustrated in the figure , the O&G of the brackish and potable source waters were measured at 0.3 and 0.4 mg/l, respectively, on 31 Aug 96. The O&G concentrations at Wake Island exhibit weak characteristic strengths when compared to table 1. Although the O&G loading are relatively weak in strength without primary treatment the waste is being directly discharged to the local ocean ecology.

## Solids / Residue

The measure of the solids concentration of a water source is an indicator as to the palatability (for drinking water uses) or the suitability of the water for industrial applications or on the receiving body of water ecosystem. Solids (residue) are measured by three methods to indicate the total solids, dissolved solids, and the suspended solids. These three parameters further define the treatability of the water source to physical or chemical treatment processes. Total solids are the amount of

material that remains after evaporation and drying under controlled conditions. Dissolved solids are that fraction of the total solids remaining in solution after passing through a 2 micron (µm) filter. Suspended Solids are that fractional weight of the solids in solution remaining on the filter.

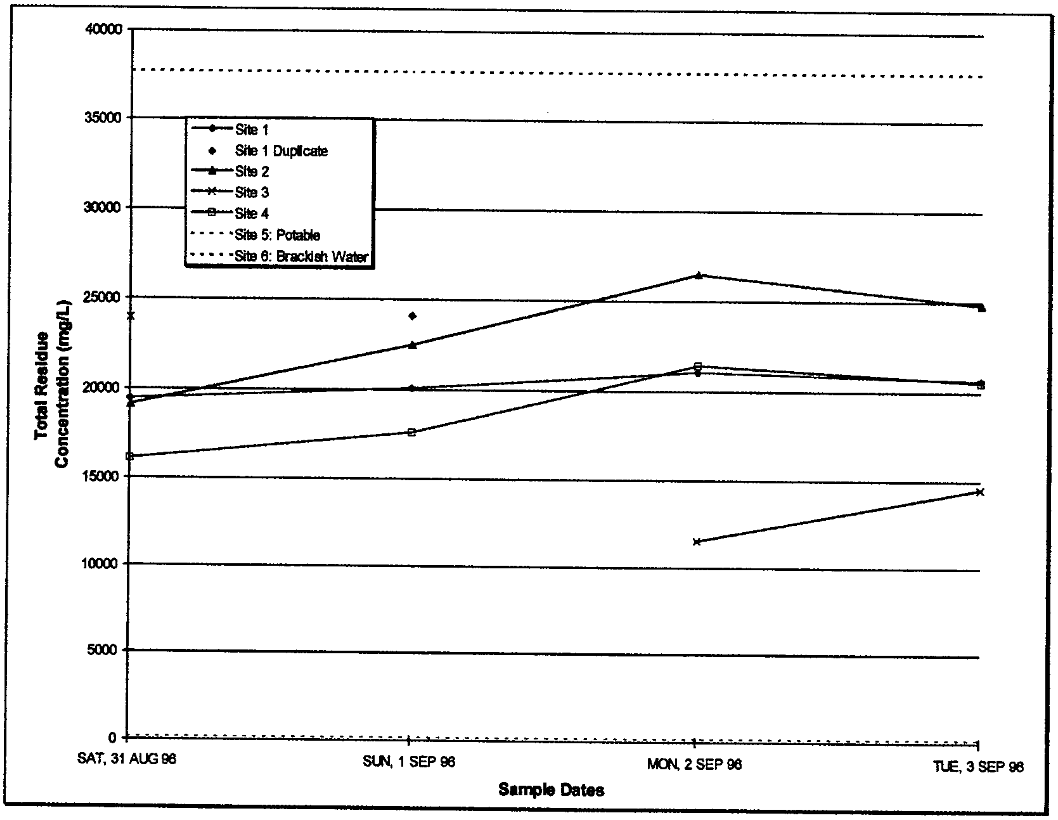



Figure 11. Total Residue

## Total Residue

The measured concentrations for total residue were below the brackish source water concentration of 37,702 mg/l. Receiving ocean water solids concentrations were not obtained during the survey but are not expected to be significantly different than the brackish source water.

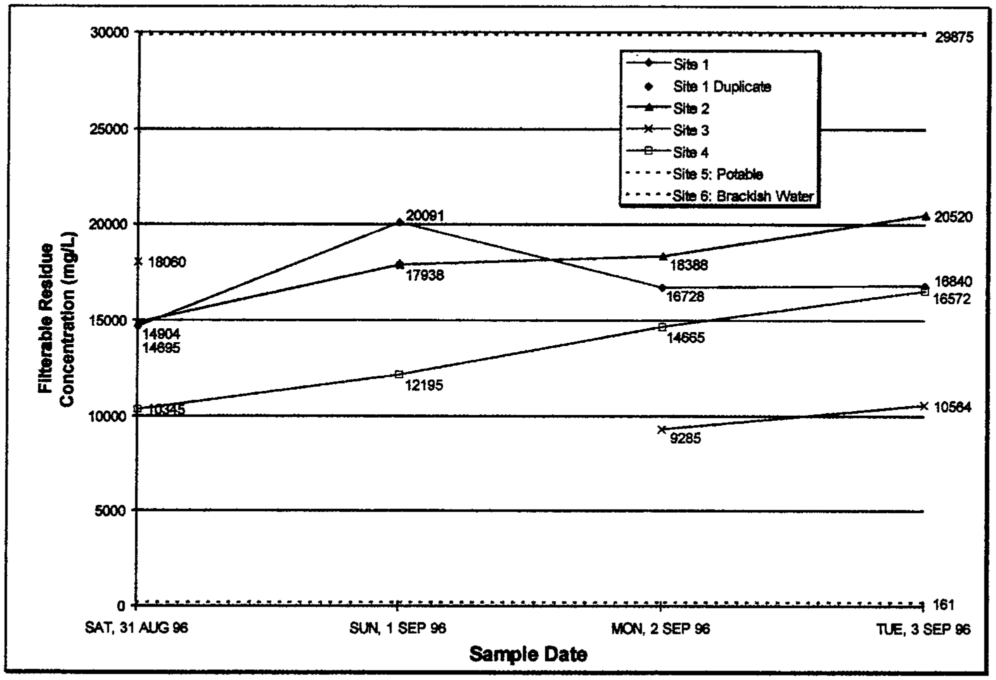



Figure 12. Filterable Residue

## Filterable Residue

The measured concentrations of filterable residue were below the brackish source water concentration of 29,875 mg/l.

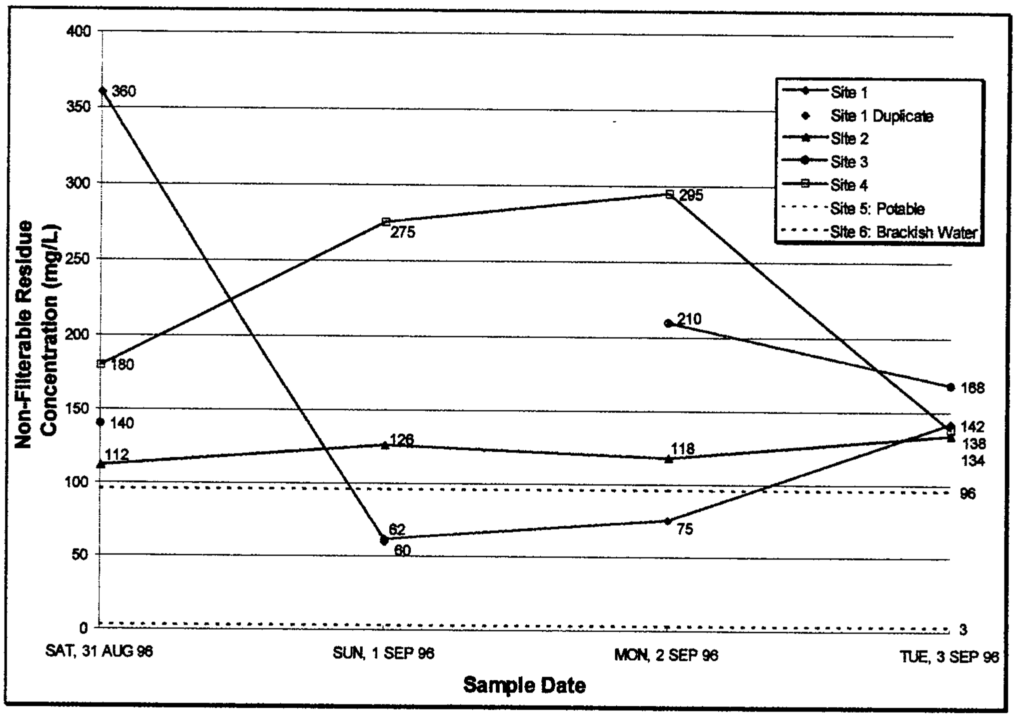
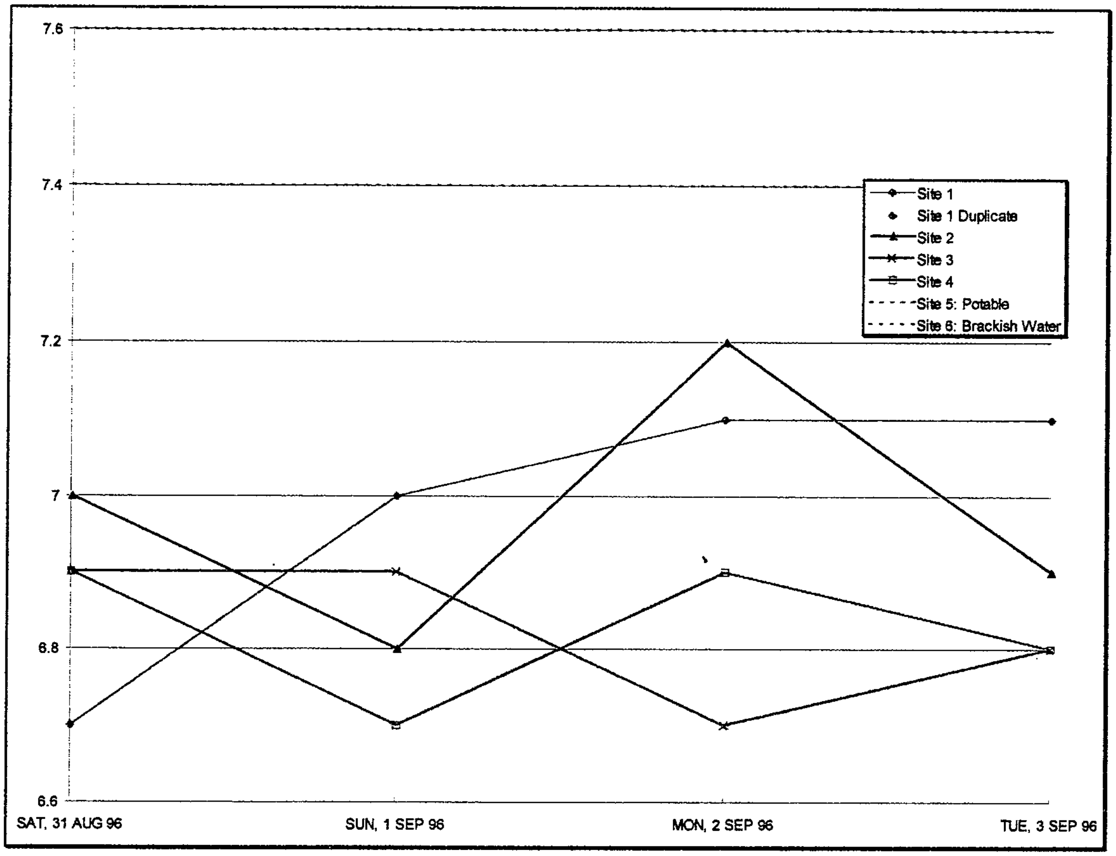



Figure 13. Non-Filterable Residue




# Figure 14. pH

## PH

The pH concentration of the wastewaters are slightly lower than the source waters but not significantly lower to cause a problem in the receiving water body at Peacock Point.

## CONCLUSION

Wake Island is best described as being a small community wastewater system that produces a weak strength effluent. The impact of this effluent on the receiving waters of the Pacific Ocean should be considered minimal. Wastewater receives no effective treatment other than being sent through a series of lift stations to the final outfall at Peacock Point. The parameters: Chemical Oxygen Demand, Residues, pH, and Oil & Grease should be used to demonstrate to regulatory officials that the current permanent population does not have a significant impact on the receiving waters and that a NPDES permit may not be required. The Department of the Army should prepare the necessary permit application documentation and enter into negotiations with officials from Region IX and determine whether a NPDES permit will be required.

If substantial mission operation increases occur on the island, the concentration of the wastewater effluent will also increase. At the time of the survey, the base population doubles from 150 to approximately 300 personnel during mission operations. This increase, however, is not believed to have a significant impact on the strength of the wastewater effluent. If Wake Island's permanent population were significantly increased, it would be wise to install at least a primary treatment system such as a septic system. A septic system placed at lift station 9 would be both cost effective and reasonable. A septic tank would reduce the Oil and Grease and Chemical Oxygen Demand concentrations. A septic system would require periodic maintenance and sludge removal. The sludge could be land applied to an area such as the island golf course.

### General Assessment

Wake Island is a territory of the United States. As such, it is required to comply with the US environmental regulations under the direct authority of Region IX of the Environmental Protection Agency. The Department of Defense Overseas Environmental Baseline Guidance Document is applicable for all US military installations located outside the soils of the United States. In overseas locations where the DoD executive agent has negotiated with the host nation and drafted Final Governing Standards (FGS) for environmental compliance within that country, the FGS will supersede all other documents.

Wake Island is a small community water system. Rainwater is utilized as the primary potable water source. The wastewater effluent generated is of weak strength. The incinerator on the island is used to destroy light amounts of general food rubbish. The landfill and adjacent burn pit receive small but un-quantified amounts of domestic solid waste. Hazardous waste was actively being managed by the Hickam AFB environmental flight.

The results of this wastewater characterization survey should be used to identify to the regulatory agency the significant findings from this survey and the

subsequent environmental impact that the mission operations have on the island's ecosystem. Since Wake Island has never had a National Pollutant Discharge Elimination System (NPDES) permit for its waste water effluent at Peacock Point, this data should be incorporated into the review for whether Wake Island will be required to obtain a NPDES permit.

Recommend that a septic system be procured and installed at lift station 9. A septic system would provide sufficient treatment to reduce the Oil & Grease concentrations and the oxygen demand loading on the receiving waters at Peacock Point.

Recommend that the medical technicians initiate monitoring for pH, and chlorine residual during their routine bacteriological sampling. Positive bacteria results can not identify the potential source of the problem without pH and chlorine residual monitoring.

It was also identified that the island may experience supply shortfalls with its gaseous chlorine and had been without for extended periods of time. Recommend that civil engineering maintain an adequate supply of either household bleach or swimming pool calcium hypochlorite (HTH) for emergency chlorination/disinfection requirements. Further recommend that if bleach is the material of choice, that stock levels be rotated through the base supply activity on the island. This will maintain freshness and strength of the household bleach.

## Compliance

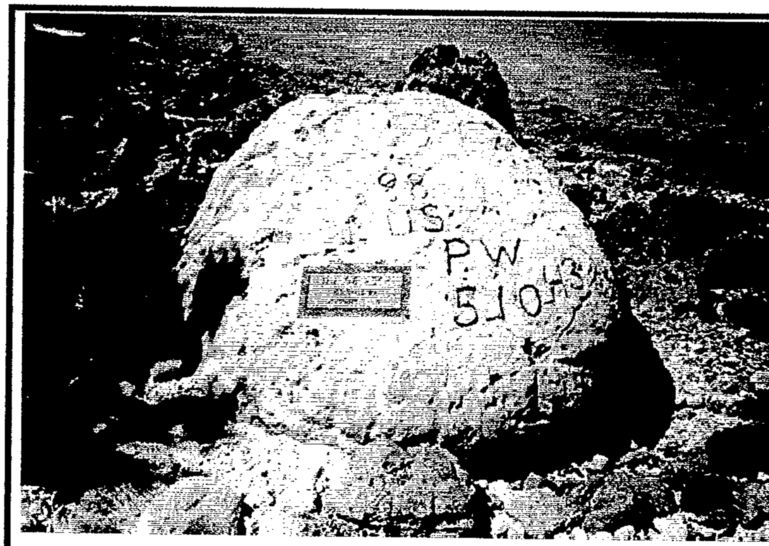
Operational Compliance should reside with the agency responsible for generating the waste. At the time of the survey, the Department of the Army was maintaining operational control of all activities on the island. Therefore, the host Army installation supporting Wake Island should be providing oversight and management control on all active operations. The Army must be a responsible tenant for its operations so as to not further impact the ecological health of the real property assets or possible compliance status.

Historical Compliance. The Air Force is the holder of the real property assets for Wake Island and should initiate the programs to fully characterize and identify all the historical impacts on the island. At the time of the survey the Air Force held the real property assets through Hickam AFB. The identification of sites eligible under the Defense Environmental Restoration Act (DERA) and the Installation Restoration Program (IRP) should be programmed and managed through the Air Force. After being programmed, the Air Force and the Army may elect to negotiate the possibility of transferring the restoration programs and real property accounts.

## APPENDIX A

Appendix A


**Wake Island**



**POW Rock Memorial**

Sewage pump station number 10, building 1168, is located in the USASSDC billeting and administrative area. The population served by lift station 10 are non-permanent residents and fluctuates in direct response from the scheduled missile testing requirements. The pumps are automatically controlled (float controls) and pumps sewage to lift station number nine.

Lift Station 9, building 1038, receives sewage from lift station number 10, the dining hall, temporary lodging facility/transient quarters, library, bowling alley, and the Drifter's Reef Bar and Grill. This zone is the largest area on the island generating domestic waste. Lift station 9 was a primary sampling location as it represents the majority of the traditional domestic sanitary waste loading on the island.

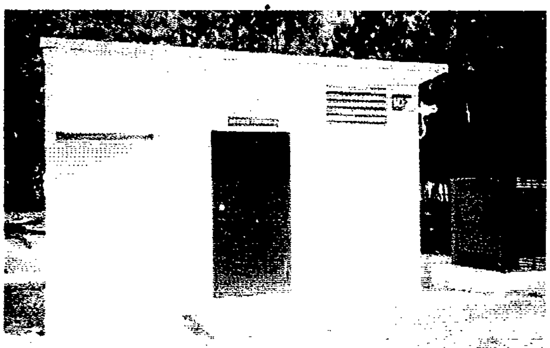


**Figure 1. Lift Station 9**

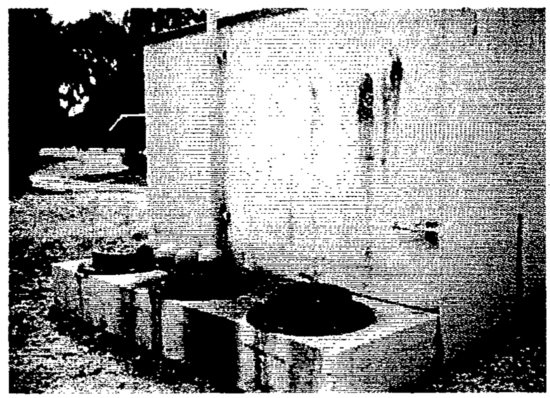


**Figure 1. Lift Station 9**

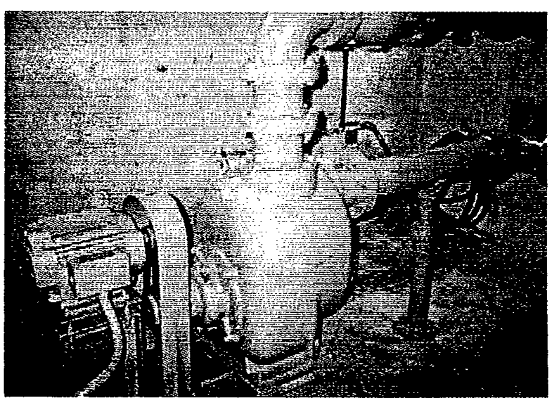


**Figure 2. Lift Station 9: Pump Motors**

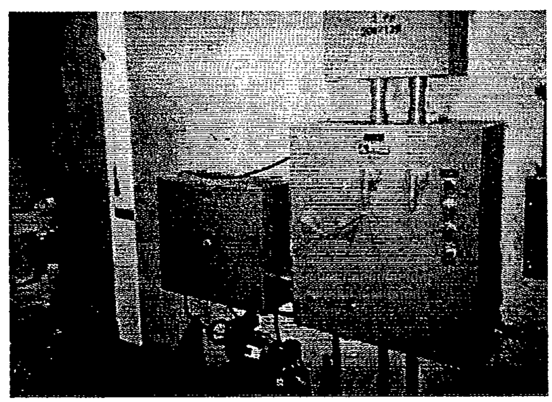


**Figure 5. Lift Station 9; Control System**

Lift stations 8, 6, and 5 (buildings 2059, 800, and 600, respectively) receive waste water from the family housing area. The housing units that are still inhabited consist of the Mr. Fusco's residence, and three units occupied by National Oceanic and Atmospheric Administration personnel. The vast majority of the family housing units are not inhabitable, condemned, or demolished. All the wastewater from lift station 5 flows

into lift station 4. Lift station 4 was another sampling location during the characterization survey.

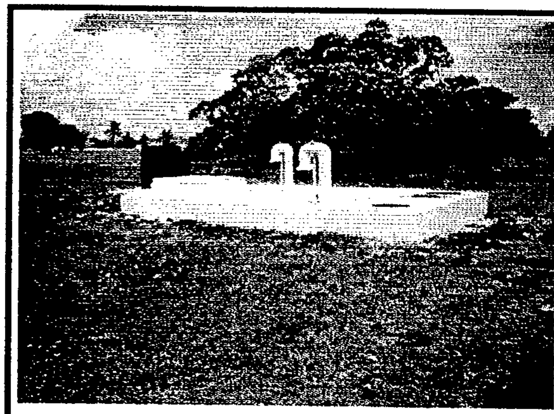


Figure 6. Lift Station 8

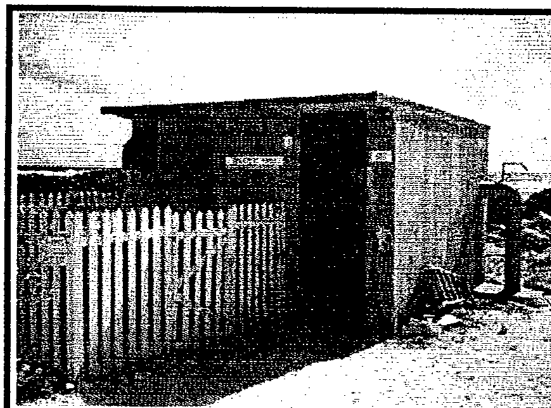


Figure 7. Lift Station 1

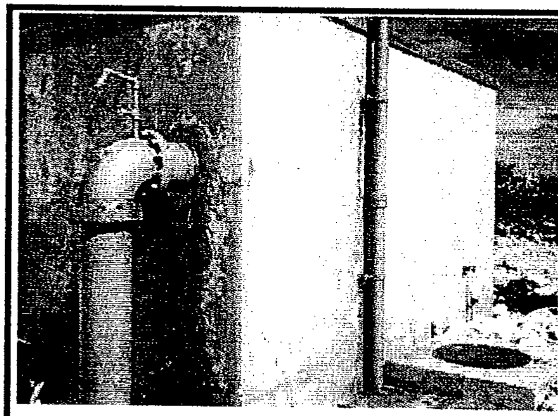


Figure 8. Lift Station 1

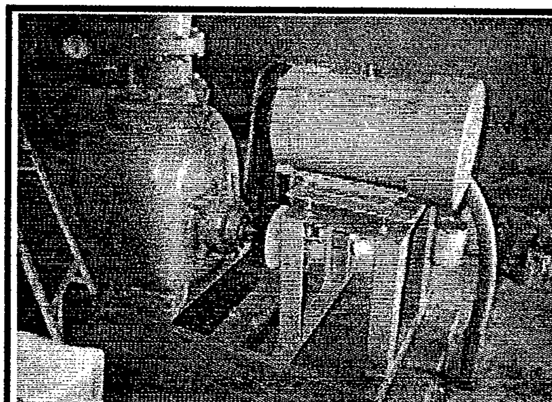


Figure 9. Lift Station 1

Lift Station 7, building 1500, collects sewage from all the industrial workshop areas. The industrial area includes civil engineering shops: coatings (paint), vehicle maintenance, refrigeration, supply, entomology, incinerator, aerospace ground equipment (AGE) maintenance, POL storage area, and liquid fuels maintenance. Lift Station 7 is located on the interior side of the island, nearest the northwest edge of the aircraft parking area and aircraft fuel storage facility. This lift station had only one small pump installed at the time of the survey. The waste from Station 7 flows to Lift Station 4 located on the main sewer line of the island.

Lift Station 4 combines the industrial area wastewater with the sewage as discussed previously from the housing and community area and elevates it for gravity flow to Lift Station 3, which passes the sewage to Lift Station 1.

Lift Station 2, building 1520 receives wastewater from the passenger terminal and base operation building. This wastewater is pumped to sewage Lift Station 1.

Building 107 is the aircraft waste shredder assembly. Sanitary waste from transient aircraft is pumped from the aircraft and disposed at this facility. The waste from this facility flows to lift station one.

Lift Station 1, building 1520 receives all the wastewater water from Wake Island domestic and industrial maintenance activities. Station 1 is the final lift station prior to the wastewater treatment plant near Peacock Point.

**Figure 10. Peacock Point**

The wastewater treatment plant was functional at one time, but now is just a flow through structure to the ocean outfall which is located off Peacock Point. The plant had two comminutors installed at the headworks to shred the large particulates. According to interviews with the water system operators, the comminutors have been operationally off-line for at least 8 years. The remaining structure of the plant remains intact although the electrical pumps and unit processes such as the skimming tanks and the associated covered pits haven't been maintained for a number of years. The only operations or maintenance activity prior to the survey was the mowing of the grass and the application of a new coat of bright green paint on all wooden structures at the site.

The actual location of the outfall was not physically inspected because it is approximately 100 yards off shore and was reported by Mr. Fusco to have a healthy shark population.

# Appendix B

## Table B-1 Wake Island
## Site 1: Wastewater Treatment Influent to Ocean
### Analyte Groups A, B, C, D, E, F AND G
Wastewater Characterization Survey: 31 August - 3 September 1996

| | | | DUPLICATE | | |
|---|---|---|---|---|---|
| | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
| GROUP A & B ANALYTES (mg/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Chemical Oxygen Demand | 200 | 224 | 362 | 315 | 305 |
| Oil and Grease | 1.7 | 1.9 | 1.6 | 1.7 | 2.2 |
| Total Petroleum Hydrocarbon | <1 | 1.6 | <1 | <1 | <0.1 |
| | | | | | |
| GROUP C ANALYTES (mg/L) | | | | | |
| Ammonia | 14.8 | 14.8 | 16 | 14.8 | 15.6 |
| Kjeddahl Nitrogen | 18 | 13 | 14.5 | 15 | 15.5 |
| Nitrate/Nitrite | <0.01 | <0.1 | <0.1 | <0.1 | <0.1 |
| | | | | | |
| GROUP D ANALYTES (mg/L) | | | | | |
| Cyanide, Total | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| | | | | | |
| GROUP E ANALYTES (μg/L) | | | | | |
| Phenols | 10 | <10 | <10 | 13 | 30 |
| | | | | | |
| GROUP F ANALYTES (mg/L) | | | | | |
| Aluminum | 0.139 | 0.03 | LIT | <0.030 | <0.030 |
| Antimony | 0.007 | 0.011 | LIT | 0.009 | 0.008 |
| Arsenic | <0.005 | <0.050 | LIT | 0.008 | 0.007 |
| Barium | <0.050 | <0.050 | LIT | <0.050 | <0.05 |
| Beryllium | <0.001 | <0.001 | LIT | <0.001 | <0.001 |
| Cadmium | <0.001 | <0.001 | LIT | <0.001 | <0.001 |
| Total Chromium | <0.010 | <0.010 | LIT | <0.010 | <0.010 |
| Cobalt | <0.050 | <0.050 | LIT | <0.050 | <0.050 |
| Copper | <0.020 | <0.020 | LIT | <0.020 | <0.020 |
| Iron | 1.34 | 0.558 | LIT | 0.498 | 0.38 |
| Lead | <0.020 | <0.020 | LIT | <0.020 | <0.020 |
| Manganese | 0.042 | 0.048 | LIT | 0.047 | 0.044 |
| Mercury | <0.0002 | <0.0002 | LIT | <0.0002 | <0.002 |
| Molybdenum | <0.030 | <0.030 | LIT | <0.030 | <0.030 |
| Nickel | <0.020 | <0.030 | LIT | <0.030 | <0.020 |
| Selenium | 0.028 | <0.020 | LIT | 0.007 | 0.006 |
| Silver | <0.010 | 0.032 | LIT | <0.010 | <0.010 |
| Thallium | 0.003 | 0.008 | LIT | 0.01 | 0.006 |
| Titanium | 0.003 | <0.050 | LIT | <0.050 | <0.050 |
| Vanadium | <0.050 | <0.0050 | LIT | <0.050 | <0.050 |
| Zinc | <0.050 | <0.050 | LIT | <0.050 | <0.050 |
| | | | | | |
| Group G (mg/L) | | | | | |
| Acidity, Total | 60 | 24 | 24 | 26 | 28 |
| Alkalinity, Total | 376 | 261 | 291 | 315 | 313 |
| Alkalinity, Bicarbonate | 376 | 261 | 291 | 315 | 313 |
| Bromide | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chloride | 8540 | 8290 | 8790 | 7590 | 8490 |
| Residue Total | 19495 | 20091 | 24122 | 21097 | 20652 |
| Residue, Filterable (TDS) | 14695 | 16871 | 17941 | 16728 | 16840 |
| Residue, Nonfilterable (TSS) | 360 | 62 | 60 | 75 | 142 |
| Surfactants | 2 | 2.4 | 2.6 | 2.4 | 2.4 |
| | | | | | |
| | | | | | |
| ON SITE ANALYSES | | | | | |
| pH (units) | 6.7 | 7 | 7 | 7.1 | 7.1 |
| Temperature (°C) | 33 | 30 | 30 | 32 | 32 |
| | | | | | |
| SAMPLE NUMBERS | CN961800 | CN961824 | CN961828 | CN961852 | CN961876 |
| | | | | | |
| | | | | | |

# Table B-2 Wake Island
## Site 1: Wastewater Treatment Influent to Ocean
### Volatile Compounds
Wastewater Characterization Survey: 31 August - 3 September 1996

| | | | DUPLICATE | | |
|---|---|---|---|---|---|
| EPA METHOD 601/602/624 | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
| VOLATILE COMPOUNDS (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Benzene | <5 | <5 | <5 | <5 | <5 |
| Benzyl Chloride | <5 | <5 | <5 | <5 | <5 |
| Bromobenzene | <5 | <5 | <5 | <5 | <5 |
| Bromodichloromethane | <5 | <5 | <5 | <5 | <5 |
| Bromoform | <5 | <5 | <5 | <5 | <5 |
| Bromomethane | <5 | <5 | <5 | <5 | <5 |
| Carbon tetrachloride | <5 | <5 | <5 | <5 | <5 |
| Chlorobenzene | <5 | <5 | <5 | <5 | <5 |
| Chlorodibromomethane | <5 | <5 | <5 | <5 | <5 |
| Chloroethane | <5 | <5 | <5 | <5 | <5 |
| Chloroform | <5 | <5 | <5 | <5 | <5 |
| 2-Chlorethylvinyl Ether | <5 | <5 | <5 | <5 | <5 |
| Chloromethane | <5 | <5 | <5 | <5 | <5 |
| Chlorodibromomethane | <5 | <5 | <5 | <5 | <5 |
| Dibromomethane | <5 | <5 | <5 | <5 | <5 |
| 1,2-Dichlorobenzene | <5 | <5 | <5 | <5 | <5 |
| 1,3-Dichlorobenzene | <5 | <5 | <5 | <5 | <5 |
| 1,4-Dichlorobenzene | 5.3 | <5 | <5 | <5 | 5 |
| Dichlorodifluoromethane | <5 | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethane | <5 | <5 | <5 | <5 | <5 |
| 1,2-Dichloroethane | <5 | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethene | <5 | <5 | <5 | <5 | <5 |
| Trans-1,2-Dichloroethene | <5 | <5 | <5 | <5 | <5 |
| 1,2-Dichloroethene | <5 | <5 | <5 | <5 | <5 |
| 1,2-Dichloropropane | <5 | <5 | <5 | <5 | <5 |
| Cis-1,3-Dichloropropene | <5 | <5 | <5 | <5 | <5 |
| Trans-1,3-Dichloropropene | <5 | <5 | <5 | <5 | <5 |
| Ethyl Benzene | <5 | <5 | <5 | <5 | <5 |
| Methylene Chloride | <5 | <5 | <5 | <5 | <5 |
| 1,1,1,2-Tetrachloroethane | <5 | <5 | <5 | <5 | <5 |
| 1,1,2,2-Tetrachloroethane | <5 | <5 | <5 | <5 | <5 |
| Tetrachloroethylene | <5 | <5 | <5 | <5 | <5 |
| Toluene | <5 | <5 | <5 | <5 | <5 |
| 1,1,1-Trichloroethane | <5 | <5 | <5 | <5 | <5 |
| 1,1,2-Trichloroethane | <5 | <5 | <5 | <5 | <5 |
| Trichloroethylene | <5 | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane | <5 | <5 | <5 | <5 | <5 |
| 1,2,3-Trichloropropane | <5 | <5 | <5 | <5 | <5 |
| Vinyl Chloride | <5 | <5 | <5 | <5 | <5 |
| o-Xylene | <5 | <5 | <5 | <5 | <5 |
| p,m-Xylene | <5 | <5 | <5 | <5 | <5 |
| | | | | | |
| SAMPLE NUMBER | GN961801 | GN961825 | GN961829 | GN961853 | GN961876 |

# Table B-3 Wake Island
## Site 1: Wastewater Treatment Influent to Ocean
## EPA METHOD 625 - SEMI VOLATILE ORGANICS PAGE 1 OF 2
Wastewater Characterization Survey: 31 August - 3 September 1996

| | | | DUPLICATE | | |
|---|---|---|---|---|---|
| | COLLECTION DATE | COLLECTION DAT | COLLECTION DATE | COLLECTION DAT | COLLECTION DATE |
| EPA METHOD 625 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Acenaphthene | <5 | <5 | <5 | <5 | <5 |
| Acenaphthylene | <5 | <5 | <5 | <5 | <5 |
| Anthracene | <5 | <5 | <5 | <5 | <5 |
| Benzidine | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)anthracene | <5 | <5 | <5 | <5 | <5 |
| Benzo(b)fluoranthene | <5 | <5 | <5 | <5 | <5 |
| Benzo(k)fluoranthene | <5 | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | <5 | <5 | <5 | <5 | <5 |
| Benzo(ghi)perylene | <5 | <5 | <5 | <5 | <5 |
| Bis(2-chloroethyl)ether | <5 | <5 | <5 | <5 | <5 |
| Bis(2-chloroethoxy)methane | <5 | <5 | <5 | <5 | <5 |
| Bis(2-ethylhexyl)phthalate | 14.6 | 16.5 | 12.3 | 14.3 | <5 |
| Bis(2-chloroisopropyl)ether | <5 | <5 | <5 | <5 | <5 |
| 4-Bromophenyl phenyl ether | <5 | <5 | <5 | <5 | <5 |
| Butylbenzylphthalate | <5 | <5 | <5 | <5 | <5 |
| 2-Chloronaphthalene | <5 | <5 | <5 | <5 | <5 |
| 4-Chlorophenyl phenyl ether | <5 | <5 | <5 | <5 | <5 |
| 2-Chlorophenol | <5 | <5 | <5 | <5 | <5 |
| Chrysene | <5 | <5 | <5 | <5 | <5 |
| Dibenzo(a,h)anthracene | <5 | <5 | <5 | <5 | <5 |
| Di-n-butylphthalate | 57.1 | 37.7 | 23.3 | 46.3 | 28.5 |
| 1,2-Dichlorobenzene | <5 | <5 | <5 | <5 | <5 |
| 1,3-Dichlorobenzene | <5 | <5 | <5 | <5 | <5 |
| 1,4-Dichlorobenzene | <5 | <5 | <5 | <5 | <5 |
| 3,3-Dichlorobenzidine | <5 | <5 | <5 | <5 | <5 |
| Diethyl phthalate | <5 | <5 | <5 | <5 | <5 |
| Dimethyl phthalate | <5 | <5 | <5 | <5 | <5 |
| 2,4-Dinitrotoluene | <5 | <5 | <5 | <5 | <5 |
| 2,6-Dinitrotoluene | <5 | <5 | <5 | <5 | <5 |
| Di-n-octyl phthalate | 5.1 | <5 | <5 | <5 | <5 |
| Fluoranthene | <5 | <5 | <5 | <5 | <5 |
| Fluorene | <5 | <5 | <5 | <5 | <5 |
| Hexachlorobenzene | <5 | <5 | <5 | <5 | <5 |
| Hexachlorobutadiene | <5 | <5 | <5 | <5 | Not Tested |
| Hexachlorocyclopentadiene | <5 | <5 | <5 | <5 | <5 |
| Hexachloroethane | <5 | <5 | <5 | <5 | <5 |

# Table B-3 Wake Island
## Site 1: Wastewater Treatment Influent to Ocean
## EPA METHOD 625 - SEMI VOLATILE ORGANICS PAGE 2OF 2
Wastewater Characterization Survey: 31 August - 3 September 1996

| | | | DUPLICATE | | |
|---|---|---|---|---|---|
| | COLLECTION DATE | COLLECTION DAT | COLLECTION DATE | COLLECTION DAT | COLLECTION DATE |
| EPA METHOD 625 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Indeno(1,2,3-cd)pyrene | <5 | <5 | <5 | <5 | <5 |
| Isophorone | <5 | <5 | <5 | <5 | <5 |
| Naphthalene | <5 | <5 | <5 | <5 | <5 |
| Nitrobenzene | <5 | <5 | <5 | <5 | <5 |
| N-Nitrosodi-n-propylamine | <5 | <5 | <5 | <5 | <5 |
| N-Nitrosodiphenylamine | <5 | <5 | <5 | <5 | <5 |
| Phenanthrene | <5 | <5 | <5 | <5 | <5 |
| Pyrene | <5 | <5 | <5 | <5 | <5 |
| 1,2,4-Trichlorobenzene | <5 | <5 | <5 | <5 | <5 |
| 4-Chloro-3-methylphenol | <5 | <5 | <5 | <5 | <5 |
| 2,4-Dichlorophenol | <5 | <5 | <5 | <5 | <5 |
| 2,4-Dimethylphenol | <5 | <5 | <5 | <5 | <5 |
| 2,4-Dinitrophenol | <5 | <5 | <5 | <5 | <5 |
| 4,6-Dinitro-2-Methylphenol | <5 | <5 | <5 | <5 | <5 |
| 2-Nitrophenol | <5 | <5 | <5 | <5 | <5 |
| 4-Nitrophenol | <5 | <5 | <5 | <5 | <5 |
| Pentachlorophenol | <5 | <5 | <5 | <5 | <5 |
| Phenol | <5 | <5 | <5 | <5 | <5 |
| 2,4,6-Trichlorophenol | <5 | <5 | <5 | <5 | <5 |
| | | | | | |
| SAMPLE NUMBER | GN961802 | GN961826 | GN961830 | GN961854 | GN951030 |

# Table B-4 Wake Island
## Site 1: Wastewater Treatment Influent to Ocean
## EPA METHOD 608 PESTICIDES & EPA 615 HERBICIDES
Wastewater Characterization Survey: 31 August - 3 September 1996

| | | | DUPLICATE | | |
|---|---|---|---|---|---|
| COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
| EPA METHOD 608 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Aldrin | <0.40 | Broke In Transit | <0.40 | <0.40 | <0.04 |
| alpha-BHC | <0.30 | Broke In Transit | <0.30 | <0.30 | <0.03 |
| beta-BHC | <0.60 | Broke In Transit | <0.60 | <0.60 | <0.06 |
| delta-BHC | <0.90 | Broke In Transit | <0.90 | <0.90 | <0.09 |
| Lindane (gamma-BHC) | <0.30 | Broke In Transit | <0.30 | <0.30 | <0.03 |
| Chlordane | <0.14 | Broke In Transit | <0.14 | <0.14 | <0.14 |
| 4,4-DDD | <1.10 | Broke In Transit | <1.10 | <1.10 | <0.11 |
| 4,4-DDE | <0.40 | Broke In Transit | <0.40 | <0.40 | <0.04 |
| 4,4-DDT | <1.20 | Broke In Transit | <1.20 | <1.20 | <0.12 |
| Dieldrin | <0.20 | Broke In Transit | <0.20 | <0.20 | <0.02 |
| Endosulfan I | <1.40 | Broke In Transit | <1.40 | <1.40 | <0.14 |
| Endosulfan II | <0.40 | Broke In Transit | <0.40 | <0.40 | <0.04 |
| Endosulfan Sulfate | <6.60 | Broke In Transit | <6.60 | <6.60 | <0.66 |
| Endrin | <0.60 | Broke In Transit | <0.60 | <0.60 | <0.06 |
| Endrin Aldehyde | <2.30 | Broke In Transit | <2.30 | <2.30 | <0.23 |
| Heptachlor | <0.30 | Broke In Transit | <0.30 | <0.30 | <0.03 |
| Heptachlor Epoxide | <8.30 | Broke In Transit | <8.30 | <8.30 | <0.83 |
| Methoxychlor | <17.60 | Broke In Transit | <17.60 | <17.60 | <1.76 |
| Texaphene | <10 | Broke In Transit | <10 | <10 | <1 |
| Aroclor 1016 | <10 | Broke In Transit | <10 | <10 | <1 |
| Aroclor 1221 | <10 | Broke In Transit | <10 | <10 | <1 |
| Aroclor 1232 | <10 | Broke In Transit | <10 | <10 | <1 |
| Aroclor 1242 | <6.50 | Broke In Transit | <6.50 | <6.50 | <0.65 |
| Aroclor 1248 | <10 | Broke In Transit | <10 | <10 | <1 |
| Aroclor 1254 | <10 | Broke In Transit | <10 | <10 | <1 |
| Aroclor 1260 | <10 | Broke In Transit | <10 | <10 | <1 |
| | | | | | |
| | | | | | |
| SAMPLE NUMBER | GN961800 | GN961824 | GN961828 | GN961852 | GN961876 |
| | | | | | |
| | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
| EPA METHOD 615 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| 2,4-D | <1.2 | <1.2 | <1.2 | <1.2 | <1.2 |
| 2,4-DB | <0.91 | <0.9 | <0.9 | <0.91 | <0.91 |
| 2,4,5-T | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| Dalapon | <5.8 | <5.8 | <5.8 | <5.8 | <5.8 |
| Dicamba | <0.27 | <0.27 | <0.27 | <0.27 | <0.27 |
| Dichloroprop | <0.65 | <0.65 | <0.65 | <0.65 | <0.65 |
| Dinseb | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 |
| MCPA | <249 | <249 | <249 | <249 | <249 |
| MCPP | <192 | <192 | <192 | <192 | <192 |
| Silvex | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 |
| | | | | | |
| | | | | | |
| SAMPLE NUMBER | GN961803 | GN961827 | GN961831 | GN961855 | GN961879 |

# Appendix C

# Table C-1 Wake Island
## Site 2: Pump Station #1 Passenger Terminal
### Analyte Groups A, B, C, D, E, F AND G
Wastewater Characterization Survey: 31 August - 3 September 1996

| | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
|---|---|---|---|---|
| GROUP A & B ANALYTES (mg/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Chemical Oxygen Demand | 630 | 452 | 510 | 465 |
| Oil and Grease | 3.2 | 2.4 | 2 | <0.3 |
| Total Petroleum Hydrocarbon | <1 | <1 | <1 | <1 |
| | | | | |
| GROUP C ANALYTES (mg/L) | | | | |
| Ammonia | 21.2 | 12.6 | 11.6 | 13.2 |
| Kjeldahl Nitrogen | 16 | 11.5 | 12 | 13 |
| Nitrate/Nitrite | <0.10 | 0.18 | <0.1 | <0.1 |
| | | | | |
| GROUP D ANALYTES (mg/L) | | | | |
| Cyanide, Total | <0.005 | <0.005 | <0.005 | <0.005 |
| | | | | |
| GROUP E ANALYTES (μg/L) | | | | |
| Phenols | 1350 | 90 | 84 | 47 |
| | | | | |
| GROUP F ANALYTES (mg/L) | | | | |
| Aluminum | Leaked In Transit | 0.064 | 0.035 | 0.41 |
| Antimony | Leaked In Transit | 0.007 | 0.009 | 0.009 |
| Arsenic | Leaked In Transit | 0.005 | 0.005 | 0.009 |
| Barium | Leaked In Transit | <0.050 | <0.050 | <0.05 |
| Beryllium | Leaked In Transit | <0.001 | <0.001 | <0.001 |
| Cadmium | Leaked In Transit | <0.001 | <0.001 | <0.001 |
| Total Chromium | Leaked In Transit | <0.010 | <0.010 | <0.010 |
| Cobalt | Leaked In Transit | <0.050 | <0.050 | <0.050 |
| Copper | Leaked In Transit | <0.020 | <0.020 | <0.020 |
| Iron | Leaked In Transit | 0.879 | 0.649 | 0.0559 |
| Lead | Leaked In Transit | <0.020 | <0.020 | <0.020 |
| Manganese | Leaked In Transit | 0.039 | 0.036 | 0.032 |
| Mercury | Leaked In Transit | <0.0002 | <0.0002 | <0.0002 |
| Molybdenum | Leaked In Transit | <0.030 | <0.030 | <0.030 |
| Nickel | Leaked In Transit | <0.020 | <0.020 | <0.020 |
| Selenium | Leaked In Transit | 0.006 | 0.02 | 0.006 |
| Silver | Leaked In Transit | <0.010 | <0.010 | <0.010 |
| Thallium | Leaked In Transit | 0.006 | 0.008 | 0.015 |
| Titanium | Leaked In Transit | <0.050 | <0.050 | <0.050 |
| Vanadium | Leaked In Transit | <0.050 | <0.050 | <0.050 |
| Zinc | Leaked In Transit | <0.050 | <0.050 | <0.050 |
| | | | | |
| Group G (mg/L) | | | | |
| Acidity, Total | 32 | 30 | 18 | 28 |
| Alkalinity, Total | 337 | 271 | 279 | 317 |
| Alkalinity, Bicarbonate | 337 | 271 | 279 | 317 |
| Bromide | <0.1 | <0.1 | <0.1 | <0.1 |
| Chloride | 7960 | 8900 | 9220 | 8460 |
| Residue Total | 19135 | 22521 | 26528 | 24879 |
| Residue, Filterable (TDS) | 14904 | 17938 | 18388 | 20520 |
| Residue, Nonfilterable (TSS) | 112 | 126 | 118 | 134 |
| Surfactants | 3.4 | 2.4 | 2.4 | 3.6 |
| | | | | |
| ON SITE ANALYSES | | | | |
| pH (units) | 7 | 6.8 | 7.2 | 6.9 |
| Temperature (°C) | 34 | 30 | 28 | 32 |
| | | | | |
| SAMPLE NUMBERS | CN961804 | CN961832 | CN961856 | CN961880 |

## Table C-2 Wake Island
## Site 2: Pump Station #1 Passenger Terminal
### Volatile Compounds
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| EPA METHOD 601/602/624 | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
|---|---|---|---|---|
| VOLATILE COMPOUNDS (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Benzene | <5 | <5 | <5 | <5 |
| Benzyl Chloride | <5 | <5 | <5 | <5 |
| Bromobenzene | <5 | <5 | <5 | <5 |
| Bromodichloromethane | <5 | <5 | <5 | <5 |
| Bromoform | <5 | <5 | <5 | <5 |
| Bromomethane | <5 | <5 | <5 | <5 |
| Carbon tetrachloride | <5 | <5 | <5 | <5 |
| Chlorobenzene | <5 | <5 | <5 | <5 |
| Chlorodibromomethane | <5 | <5 | <5 | <5 |
| Chloroethane | <5 | <5 | <5 | <5 |
| Chloroform | <5 | <5 | <5 | <5 |
| 2-Chlorethylvinyl Ether | <5 | <5 | <5 | <5 |
| Chloromethane | <5 | <5 | <5 | <5 |
| Chlorodibromomethane | <5 | <5 | <5 | <5 |
| Dibromomethane | <5 | <5 | <5 | <5 |
| 1,2-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,3-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,4-Dichlorobenzene | 30.4 | 29.9 | 27.8 | 32.1 |
| Dichlorodifluoromethane | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethane | <5 | <5 | <5 | <5 |
| 1,2-Dichloroethane | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethene | <5 | <5 | <5 | <5 |
| Trans-1,2-Dichloroethene | <5 | <5 | <5 | <5 |
| 1,2-Dichloroethene | <5 | <5 | <5 | <5 |
| 1,2-Dichloropropane | <5 | <5 | <5 | <5 |
| Cis-1,3-Dichloropropene | <5 | <5 | <5 | <5 |
| Trans-1,3-Dichloropropene | <5 | <5 | <5 | <5 |
| Ethyl Benzene | <5 | <5 | <5 | <5 |
| Methylene Chloride | <5 | <5 | <5 | <5 |
| 1,1,1,2-Tetrachloroethane | <5 | <5 | <5 | <5 |
| 1,1,2,2-Tetrachloroethane | <5 | <5 | <5 | <5 |
| Tetrachloroethylene | <5 | <5 | <5 | <5 |
| Toluene | <5 | <5 | <5 | <5 |
| 1,1,1-Trichloroethane | <5 | <5 | <5 | <5 |
| 1,1,2-Trichloroethane | <5 | <5 | <5 | <5 |
| Trichloroethylene | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane | <5 | <5 | <5 | <5 |
| 1,2,3-Trichloropropane | <5 | <5 | <5 | <5 |
| Vinyl Chloride | <5 | <5 | <5 | <5 |
| o-Xylene | <5 | <5 | <5 | <5 |
| p,m-Xylene | <5 | <5 | <5 | <5 |
| | | | | |
| SAMPLE NUMBER | GN961805 | GN961833 | GN961853 | GN961881 |

# Table C-3 Wake Island
## Site 2: Pump Station #1 Passenger Terminal
## EPA METHOD 625 - SEMI VOLATILE ORGANICS
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | COLLECTION DAT | COLLECTION DATE | COLLECTION DATE |
|---|---|---|---|---|
| EPA METHOD 625 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Acenaphthene | <5 | <5 | <5 | <5 |
| Acenaphthylene | <5 | <5 | <5 | <5 |
| Anthracene | <5 | <5 | <5 | <5 |
| Benzidine | <5 | <5 | <5 | <5 |
| Benzo(a)anthracene | <5 | <5 | <5 | <5 |
| Benzo(b)fluoranthene | <5 | <5 | <5 | <5 |
| Benzo(k)fluoranthene | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | <5 | <5 | <5 | <5 |
| Benzo(ghi)perylene | <5 | <5 | <5 | <5 |
| Bis(2-chloroethyl)ether | <5 | <5 | <5 | <5 |
| Bis(2-chloroethoxy)methane | <5 | <5 | <5 | <5 |
| Bis(2-ethylhexyl)phthalate | 74.6 | 12.2 | 89.3 | 68.4 |
| Bis(2-chloroisopropyl)ether | <5 | <5 | <5 | <5 |
| 4-Bromophenyl phenyl ether | <5 | <5 | <5 | <5 |
| Butylbenzylphthalate | 17.7 | 19.6 | 12.6 | 9.2 |
| 2-Chloronaphthalene | <5 | <5 | <5 | <5 |
| 4-Chlorophenyl phenyl ether | <5 | <5 | <5 | <5 |
| 2-Chlorophenol | <5 | <5 | <5 | <5 |
| Chrysene | <5 | <5 | <5 | <5 |
| Dibenzo(a,h)anthracene | <5 | <5 | <5 | <5 |
| Di-n-butylphthalate | 28.4 | 18.9 | 16.5 | 9.3 |
| 1,2-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,3-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,4-Dichlorobenzene | 12.1 | <5 | <5 | 14 |
| 3,3-Dichlorobenzidine | <5 | <5 | <5 | <5 |
| Diethyl phthalate | <5 | <5 | 5.1 | <5 |
| Dimethyl phthalate | <5 | <5 | <5 | <5 |
| 2,4-Dinitrotoluene | <5 | <5 | <5 | <5 |
| 2,6-Dinitrotoluene | <5 | <5 | <5 | <5 |
| Di-n-octyl phthalate | 11.6 | <5 | <5 | <5 |
| Fluoranthene | <5 | <5 | <5 | <5 |
| Fluorene | <5 | <5 | <5 | <5 |
| Hexachlorobenzene | <5 | <5 | <5 | <5 |
| Hexachlorobutadiene | <5 | <5 | <5 | Not Tested |
| Hexachlorocyclopentadiene | <5 | <5 | <5 | <5 |
| Hexachloroethane | <5 | <5 | <5 | <5 |

## Table C-3 Wake Island
## Site 2: Pump Station #1 Passenger Terminal
## EPA METHOD 625 - SEMI VOLATILE ORGANICS
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | | | | |
|---|---|---|---|---|
| Indeno(1,2,3-cd)pyrene | <5 | <5 | <5 | <5 |
| Isophorone | <5 | <5 | <5 | <5 |
| Naphthalene | <5 | <5 | <5 | <5 |
| Nitrobenzene | <5 | <5 | <5 | <5 |
| N-Nitrosodi-n-propylamine | <5 | <5 | <5 | <5 |
| N-Nitrosodiphenylamine | <5 | <5 | <5 | <5 |
| Phenanthrene | <5 | <5 | <5 | <5 |
| Pyrene | <5 | <5 | <5 | <5 |
| 1,2,4-Trichlorobenzene | <5 | <5 | <5 | Not Tested |
| 4-Chloro-3-methylphenol | <5 | <5 | <5 | <5 |
| 2,4-Dichlorophenol | <5 | <5 | <5 | <5 |
| 2,4-Dimethylphenol | <5 | <5 | <5 | <5 |
| 2,4-Dinitrophenol | <5 | <5 | <5 | <5 |
| 4,6-Dinitro-2-Methylphenol | <5 | <5 | <5 | <5 |
| 2-Nitrophenol | <5 | <5 | <5 | <5 |
| 4-Nitrophenol | <5 | <5 | <5 | <5 |
| Pentachlorophenol | <5 | <5 | <5 | <5 |
| Phenol | 182 | <5 | <5 | 10.3 |
| 2,4,6-Trichlorophenol | <5 | <5 | <5 | <5 |
| | | | | |
| SAMPLE NUMBER | GN961806 | GN961834 | GN961858 | GN961882 |

# Table C-4 Wake Island
## Site 2: Pump Station #1 Passenger Terminal
## EPA METHOD 608 PESTICIDES & EPA 615 HERBICIDES
Wastewater Characterization Survey: 31 AUG - 2 Sept 1996

| COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
|---|---|---|---|---|
| EPA METHOD 608 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Aldrin | <0.40 | <0.40 | <0.40 | <0.04 |
| alpha-BHC | <0.30 | <0.30 | <0.30 | <0.03 |
| beta-BHC | <0.60 | <0.60 | <0.60 | <0.06 |
| delta-BHC | <0.90 | <0.90 | <0.90 | <0.09 |
| Lindane (gamma-BHC) | <0.30 | <0.30 | <0.30 | <0.03 |
| Chlordane | <0.14 | <0.14 | <0.14 | <0.14 |
| 4,4-DDD | <1.10 | <1.10 | <1.10 | <0.11 |
| 4,4-DDE | <0.40 | <0.40 | <0.40 | <0.04 |
| 4,4-DDT | <1.20 | <1.20 | <1.20 | <0.12 |
| Dieldrin | <0.20 | <0.20 | <0.20 | <0.02 |
| Endosulfan I | <1.40 | <1.40 | <1.40 | <0.14 |
| Endosulfan II | <0.40 | <0.40 | <0.40 | <0.04 |
| Endosulfan Sulfate | <6.60 | <6.60 | <6.60 | <0.66 |
| Endrin | <0.60 | <0.60 | <0.60 | <0.06 |
| Endrin Aldehyde | <2.30 | <2.30 | <2.30 | <0.23 |
| Heptachlor | <0.30 | <0.30 | <0.30 | <0.03 |
| Heptachlor Epoxide | <8.30 | <8.30 | <8.30 | <0.83 |
| Methoxychlor | <17.60 | <17.60 | <17.60 | <1.76 |
| Texaphene | <10 | <10 | <10 | <1 |
| Aroclor 1016 | <10 | <10 | <10 | <1 |
| Aroclor 1221 | <10 | <10 | <10 | <1 |
| Aroclor 1232 | <10 | <10 | <10 | <1 |
| Aroclor 1242 | <6.50 | <6.50 | <6.50 | <0.65 |
| Aroclor 1248 | <10 | <10 | <10 | <1 |
| Aroclor 1254 | <10 | <10 | <10 | <1 |
| Aroclor 1260 | <10 | <10 | <10 | <1 |
| | | | | |
| | | | | |
| SAMPLE NUMBER | GN961804 | GN961832 | GN961852 | GN961880 |
| | | | | |
| EPA METHOD 615 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| 2,4-D | <1.2 | <1.2 | <1.2 | <1.2 |
| 2,4-DB | <0.91 | <0.9 | <0.91 | <0.91 |
| 2,4,5-T | <0.20 | <0.20 | <0.20 | <0.20 |
| Dalapon | <5.8 | <5.8 | <5.8 | <5.8 |
| Dicamba | <0.27 | <0.27 | <0.27 | <0.27 |
| Dichloroprop | <0.65 | <0.65 | <0.65 | <0.65 |
| Dinseb | <0.07 | <0.07 | <0.07 | <0.07 |
| MCPA | <249 | <249 | <249 | <249 |
| MCPP | <192 | <192 | <192 | <192 |
| Silvex | <0.17 | <0.17 | <0.17 | <0.17 |
| | | | | |
| | | | | |
| SAMPLE NUMBER | GN961807 | GN961835 | GN961859 | GN961883 |

# Appendix D

## Table D-1 Wake Island
## Site 3: Pump Station #4 Industrial and Housing
### Analyte Groups A, B, C, D, E, F AND G
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | COLLECTION DAT | COLLECTION DAT | COLLECTION DATE |
|---|---|---|---|---|
| GROUP A & B ANALYTES (mg/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Chemical Oxygen Demand | 548 | 285 | 400 | 278 |
| Oil and Grease | NOT TESTED | 12 | 54.4 | 7 |
| Total Petroleum Hydrocarbon | NOT TESTED | <1 | 4.8 | <1 |
| | | | | |
| GROUP C ANALYTES (mg/L) | | | | |
| Ammonia | 8 | 14.8 | 16.8 | 17.2 |
| Kjeldahl Nitrogen | 5.75 | 19 | 23 | 17 |
| Nitrate/Nitrite | 0.12 | 0.16 | <0.1 | <0.10 |
| | | | | |
| GROUP D ANALYTES (mg/L) | | | | |
| Cyanide, Total | <0.005 | <0.005 | <0.005 | <0.005 |
| | | | | |
| GROUP E ANALYTES (µg/L) | | | | |
| Phenols | 25 | 60 | 35 | 30 |
| | | | | |
| GROUP F ANALYTES (mg/L) | | | | |
| Aluminum | Leaked In Transit | 0.105 | 0.246 | 0.118 |
| Antimony | Leaked In Transit | 0.01 | 0.005 | 0.01 |
| Arsenic | Leaked In Transit | <0.005 | 0.02 | <0.005 |
| Barium | Leaked In Transit | <0.050 | <0.050 | <0.050 |
| Beryllium | Leaked In Transit | <0.001 | <0.001 | <0.001 |
| Cadmium | Leaked In Transit | <0.001 | <0.001 | <0.001 |
| Total Chromium | Leaked In Transit | <0.010 | <0.010 | <0.010 |
| Cobalt | Leaked In Transit | <0.050 | <0.050 | <0.050 |
| Copper | Leaked In Transit | 0.03 | 0.07 | 0.023 |
| Iron | Leaked In Transit | 0.416 | 0.504 | 0.322 |
| Lead | Leaked In Transit | <0.020 | <0.020 | <0.020 |
| Manganese | Leaked In Transit | <0.030 | <0.030 | <0.030 |
| Mercury | Leaked In Transit | <0.0002 | <0.0002 | <0.0002 |
| Molybdenum | Leaked In Transit | <0.030 | <0.030 | <0.030 |
| Nickel | Leaked In Transit | <0.020 | <0.020 | <0.020 |
| Selenium | Leaked In Transit | <0.005 | <0.005 | <0.005 |
| Silver | Leaked In Transit | <0.010 | <0.010 | <0.010 |
| Thallium | Leaked In Transit | <0.001 | <0.050 | <0.001 |
| Titanium | Leaked In Transit | <0.050 | <0.050 | <0.050 |
| Vanadium | Leaked In Transit | <0.050 | <0.050 | <0.050 |
| Zinc | Leaked In Transit | <0.050 | <0.050 | <0.050 |
| | | | | |
| Group G (mg/L) | | | | |
| Acidity, Total | 18 | 44 | 36 | 28 |
| Alkalinity, Total | 253 | 104 | 239 | 289 |
| Alkalinity, Bicarbonate | 253 | 104 | 239 | 289 |
| Bromide | <0.1 | <0.1 | <0.1 | <0.1 |
| Chloride | 9110 | No Sample | 4276 | 5340 |
| Residue Total | 23985 | No Sample | 11542 | 14501 |
| Residue, Filterable (TDS) | 18060 | No Sample | 9285 | 10564 |
| Residue, Nonfilterable (TSS) | 140 | No Sample | 210 | 168 |
| Surfactants | 3 | No Sample | 4.6 | 4 |
| | | | | |
| ON SITE ANALYSES | | | | |
| pH (units) | 6.9 | 6.9 | 6.7 | 6.8 |
| Temperature (°C) | 30 | 34 | 29 | 32 |
| | | | | |
| SAMPLE NUMBERS | CN961808 | CN961840 | CN961864 | CN961820 |

# Table D-2 Wake Island
## Site 3: Pump Station #4 Industrial and Housing
### Volatile Compounds
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| EPA METHOD 601/602/624 | COLLECTION DATE | COLLECTION DAT | COLLECTION DAT | COLLECTION DATE |
|---|---|---|---|---|
| VOLATILE COMPOUNDS (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Benzene | <5 | <5 | <5 | <5 |
| Benzyl Chloride | <5 | <5 | <5 | <5 |
| Bromobenzene | <5 | <5 | <5 | <5 |
| Bromodichloromethane | <5 | <5 | <5 | <5 |
| Bromoform | <5 | <5 | <5 | <5 |
| Bromomethane | <5 | <5 | <5 | <5 |
| Carbon tetrachloride | <5 | <5 | <5 | <5 |
| Chlorobenzene | <5 | <5 | <5 | <5 |
| Chlorodibromomethane | <5 | <5 | <5 | <5 |
| Chloroethane | <5 | <5 | <5 | <5 |
| Chloroform | <5 | 11.1 | 16 | 8.4 |
| 2-Chlorethylvinyl Ether | <5 | <5 | <5 | <5 |
| Chloromethane | <5 | <5 | <5 | <5 |
| Chlorodibromomethane | <5 | <5 | <5 | <5 |
| Dibromomethane | <5 | <5 | <5 | <5 |
| 1,2-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,3-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,4-Dichlorobenzene | <5 | <5 | <5 | <5 |
| Dichlorodifluoromethane | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethane | <5 | <5 | <5 | <5 |
| 1,2-Dichloroethane | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethene | <5 | <5 | <5 | <5 |
| Trans-1,2-Dichloroethene | <5 | <5 | <5 | <5 |
| 1,2-Dichloroethene | <5 | <5 | <5 | <5 |
| 1,2-Dichloropropane | <5 | <5 | <5 | <5 |
| Cis-1,3-Dichloropropene | <5 | <5 | <5 | <5 |
| Trans-1,3-Dichloropropene | <5 | <5 | <5 | <5 |
| Ethyl Benzene | <5 | <5 | <5 | <5 |
| Methylene Chloride | <5 | <5 | <5 | <5 |
| 1,1,1,2-Tetrachloroethane | <5 | <5 | <5 | <5 |
| 1,1,2,2-Tetrachloroethane | <5 | <5 | <5 | <5 |
| Tetrachloroethylene | <5 | <5 | <5 | <5 |
| Toluene | <5 | <5 | <5 | <5 |
| 1,1,1-Trichloroethane | <5 | <5 | <5 | <5 |
| 1,1,2-Trichloroethane | <5 | <5 | <5 | <5 |
| Trichloroethylene | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane | <5 | <5 | <5 | <5 |
| 1,2,3-Trichloropropane | <5 | <5 | <5 | <5 |
| Vinyl Chloride | <5 | <5 | <5 | <5 |
| o-Xylene | <5 | <5 | <5 | <5 |
| p,m-Xylene | <5 | <5 | <5 | <5 |
| | | | | |
| SAMPLE NUMBER | GN961809 | GN961841 | GN961865 | GN961821 |

# Table D-3 Wake Island
## Site 3: Pump Station #4 Industrial and Housing
## EPA METHOD 625 - SEMI VOLATILE ORGANICS
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| EPA METHOD 625 (ug/L) | COLLECTION DATE SAT, 31 AUG 96 | COLLECTION DAT SUN, 1 SEP 96 | COLLECTION DAT MON, 2 SEP 96 | COLLECTION DATE TUE, 3 SEP 96 |
|---|---|---|---|---|
| Acenaphthene | <5 | <5 | <5 | <5 |
| Acenaphthylene | <5 | <5 | <5 | <5 |
| Anthracene | <5 | <5 | <5 | <5 |
| Benzidine | <5 | <5 | <5 | <5 |
| Benzo(a)anthracene | <5 | <5 | <5 | <5 |
| Benzo(b)fluoranthene | <5 | <5 | <5 | <5 |
| Benzo(k)fluoranthene | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | <5 | <5 | <5 | <5 |
| Benzo(ghi)perylene | <5 | <5 | <5 | <5 |
| Bis(2-chloroethyl)ether | <5 | <5 | <5 | <5 |
| Bis(2-chloroethoxy)methane | <5 | <5 | <5 | <5 |
| Bis(2-ethylhexyl)phthalate | 6.3 | 220 | 92.7 | 50.2 |
| Bis(2-chloroisopropyl)ether | <5 | <5 | <5 | <5 |
| 4-Bromophenyl phenyl ether | <5 | <5 | <5 | <5 |
| Butylbenzylphthalate | <5 | <5 | <5 | <5 |
| 2-Chloronaphthalene | <5 | <5 | <5 | <5 |
| 4-Chlorophenyl phenyl ether | <5 | <5 | <5 | <5 |
| 2-Chlorophenol | <5 | <5 | <5 | <5 |
| Chrysene | <5 | <5 | <5 | <5 |
| Dibenzo(a,h)anthracene | <5 | <5 | <5 | <5 |
| Di-n-butylphthalate | 7.9 | <5 | <5 | <5 |
| 1,2-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,3-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,4-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 3,3-Dichlorobenzidine | <5 | <5 | <5 | <5 |
| Diethyl phthalate | <5 | <5 | <5 | <5 |
| Dimethyl phthalate | <5 | <5 | <5 | <5 |
| 2,4-Dinitrotoluene | <5 | <5 | <5 | <5 |
| 2,6-Dinitrotoluene | <5 | <5 | <5 | <5 |
| Di-n-octyl phthalate | <5 | <5 | <5 | <5 |
| Fluoranthene | <5 | <5 | <5 | <5 |
| Fluorene | <5 | <5 | <5 | <5 |
| Hexachlorobenzene | <5 | <5 | <5 | <5 |
| Hexachlorobutadiene | <5 | <5 | <5 | Not Tested |
| Hexachlorocyclopentadiene | <5 | <5 | <5 | <5 |
| Hexachloroethane | <5 | <5 | <5 | <5 |

## Table D-3 Wake Island
## Site 3: Pump Station #4 Industrial and Housing
## EPA METHOD 625 - SEMI VOLATILE ORGANICS
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | COLLECTION DAT | COLLECTION DAT | COLLECTION DATE |
|---|---|---|---|---|
| EPA METHOD 625 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Acenaphthene | <5 | <5 | <5 | <5 |
| Acenaphthylene | <5 | <5 | <5 | <5 |
| Anthracene | <5 | <5 | <5 | <5 |
| Benzidine | <5 | <5 | <5 | <5 |
| Benzo(a)anthracene | <5 | <5 | <5 | <5 |
| Benzo(b)fluoranthene | <5 | <5 | <5 | <5 |
| Benzo(k)fluoranthene | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene* | <5 | <5 | <5 | <5 |
| Benzo(ghi)perylene | <5 | <5 | <5 | <5 |
| Bis(2-chloroethyl)ether | <5 | <5 | <5 | <5 |
| Bis(2-chloroethoxy)methane | <5 | <5 | <5 | <5 |
| Bis(2-ethylhexyl)phthalate | 6.3 | 220 | 92.7 | 50.2 |
| Bis(2-chloroisopropyl)ether | <5 | <5 | <5 | <5 |
| 4-Bromophenyl phenyl ether | <5 | <5 | <5 | <5 |
| Butylbenzylphthalate | <5 | <5 | <5 | <5 |
| 2-Chloronaphthalene | <5 | <5 | <5 | <5 |
| 4-Chlorophenyl phenyl ether | <5 | <5 | <5 | <5 |
| 2-Chlorophenol | <5 | <5 | <5 | <5 |
| Chrysene | <5 | <5 | <5 | <5 |

# Table D-4 Wake Island
## Site 3: Pump Station #4 Industrial and Housing
## EPA METHOD 608 PESTICIDES & EPA 615 HERBICIDES
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
|---|---|---|---|---|
| EPA METHOD 608 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Aldrin | <0.40 | <0.20 | Broke In Transit | <0.04 |
| alpha-BHC | <0.30 | <0.15 | Broke In Transit | <0.03 |
| beta-BHC | <0.60 | <0.30 | Broke In Transit | <0.06 |
| delta-BHC | <0.90 | <0.45 | Broke In Transit | <0.09 |
| Lindane (gamma-BHC) | <0.30 | <0.15 | Broke In Transit | <0.03 |
| Chlordane | <0.14 | <0.70 | Broke In Transit | <0.14 |
| 4,4-DDD | <1.10 | <0.55 | Broke In Transit | <0.11 |
| 4,4-DDE | <0.40 | <0.20 | Broke In Transit | <0.04 |
| 4,4-DDT | <1.20 | <0.60 | Broke In Transit | <0.12 |
| Dieldrin | <0.20 | <0.10 | Broke In Transit | <0.02 |
| Endosulfan I | <1.40 | <0.70 | Broke In Transit | <0.14 |
| Endosulfan II | <0.40 | <0.20 | Broke In Transit | <0.04 |
| Endosulfan Sulfate | <6.60 | <3.30 | Broke In Transit | <0.66 |
| Endrin | <0.60 | <0.30 | Broke In Transit | <0.06 |
| Endrin Aldehyde | <2.30 | <1.15 | Broke In Transit | <0.23 |
| Heptachlor | <0.30 | <0.15 | Broke In Transit | <0.03 |
| Heptachlor Epoxide | <8.30 | <4.15 | Broke In Transit | <0.83 |
| Methoxychlor | <17.60 | <8.8 | Broke In Transit | <1.76 |
| Texaphene | <10 | <5.0 | Broke In Transit | <1 |
| Aroclor 1016 | <10 | <5.0 | Broke In Transit | <1 |
| Aroclor 1221 | <10 | <5.0 | Broke In Transit | <1 |
| Aroclor 1232 | <10 | <5.0 | Broke In Transit | <1 |
| Aroclor 1242 | <6.50 | <3.25 | Broke In Transit | <0.65 |
| Aroclor 1248 | <10 | <5.0 | Broke In Transit | <1 |
| Aroclor 1254 | <10 | <5.0 | Broke In Transit | <1 |
| Aroclor 1260 | <10 | <5.0 | Broke In Transit | <1 |
| | | | | |
| | | | | |
| SAMPLE NUMBER | GN961808 | GN961840 | GN961864 | GN961820 |
| | | | | |
| EPA METHOD 615 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| 2,4-D | <1.2 | <1.2 | <1.2 | <1.2 |
| 2,4-DB | <0.91 | <0.9 | <0.91 | <0.91 |
| 2,4,5-T | <0.20 | <0.20 | <0.20 | <0.20 |
| Dalapon | <5.8 | <5.8 | <5.8 | <5.8 |
| Dicamba | <0.27 | <0.27 | <0.27 | <0.27 |
| Dichloroprop | <0.65 | <0.65 | <0.65 | <0.65 |
| Dinseb | <0.07 | <0.07 | <0.07 | <0.07 |
| MCPA | <249 | <249 | <249 | <249 |
| MCPP | <192 | <192 | <192 | <192 |
| Silvex | <0.17 | <0.17 | <0.17 | <0.17 |
| | | | | |
| | | | | |
| SAMPLE NUMBER | GN961811 | GN961843 | GN961867 | GN961823 |

# Appendix E

# Table E-1 Wake Island
## Site 4: Pump Station # 9 Billeting and Community Area
### Analyte Groups A, B, C, D, E, F AND G
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
|---|---|---|---|---|
| GROUP A & B ANALYTES (mg/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Chemical Oxygen Demand | 262 | 100 | 300 | 250 |
| Oil and Grease | 8.6 | 8.9 | 9.2 | 1.4 |
| Total Petroleum Hydrocarbon | <1 | <1 | 2.4 | <1 |
| | | | | |
| GROUP C ANALYTES (mg/L) | | | | |
| Ammonia | 18.2 | 11.6 | 10.8 | 8.4 |
| Kjeldahl Nitrogen | 17 | 4 | 12.5 | 9.5 |
| Nitrate/Nitrite | 0.1 | 0.14 | <0.1 | 0.11 |
| | | | | |
| GROUP D ANALYTES (mg/L) | | | | |
| Cyanide, Total | <0.005 | <0.005 | <0.005 | <0.005 |
| | | | | |
| GROUP E ANALYTES (μg/L) | | | | |
| Phenols | 45 | 27 | 15 | <10 |
| | | | | |
| GROUP F ANALYTES (mg/L) | | | | |
| Aluminum | 0.119 | 0.342 | 0.226 | 0.03 |
| Antimony | 0.008 | 0.01 | 0.01 | 0.009 |
| Arsenic | <0.005 | 0.007 | <0.005 | <0.005 |
| Barium | <0.050 | <0.050 | <0.050 | <0.050 |
| Beryllium | <0.001 | <0.001 | <0.001 | <0.001 |
| Cadmium | <0.001 | <0.001 | <0.001 | <0.001 |
| Total Chromium | <0.010 | <0.010 | <0.010 | <0.010 |
| Cobalt | <0.050 | <0.050 | <0.050 | <0.050 |
| Copper | <0.010 | <0.020 | <0.020 | <0.020 |
| Iron | 0.596 | 2.28 | 1.43 | <0.692 |
| Lead | <0.020 | <0.020 | <0.020 | <0.020 |
| Manganese | <0.030 | 0.037 | 0.032 | 0.04 |
| Mercury | <0.0002 | <0.0002 | <0.0002 | <0.0002 |
| Molybdenum | <0.030 | <0.030 | <0.030 | <0.030 |
| Nickel | <0.020 | <0.020 | <0.020 | <0.020 |
| Selenium | 0.006 | <0.005 | 0.012 | 0.007 |
| Silver | <0.010 | <0.010 | <0.010 | <0.010 |
| Thallium | 0.002 | 0.005 | 0.003 | 0.003 |
| Titanium | <0.050 | <0.050 | <0.050 | <0.050 |
| Vanadium | <0.050 | <0.050 | <0.050 | <0.050 |
| Zinc | <0.050 | <0.050 | <0.050 | <0.050 |
| | | | | |
| Group G (mg/L) | | | | |
| Acidity, Total | 32 | 20 | 30 | 6 |
| Alkalinity, Total | 311 | 291 | 347 | 243 |
| Alkalinity, Bicarbonate | 311 | 291 | 348 | 243 |
| Bromide | <0.1 | <0.1 | <0.1 | <0.1 |
| Chloride | 5390 | 6830 | 6980 | 9340 |
| Residue Total | 16100 | 17596 | 21472 | 20576 |
| Residue, Filterable (TDS) | 10345 | 12195 | 14665 | 16572 |
| Residue, Nonfilterable (TSS) | 180 | 275 | 295 | 138 |
| Surfactants | 3.8 | 2.2 | 2.2 | 1.8 |
| | | | | |
| ON SITE ANALYSES | | | | |
| pH (units) | 6.9 | 6.7 | 6.9 | 6.8 |
| Temperature (°C) | 35 | 30 | 29 | 32 |
| | | | | |
| SAMPLE NUMBERS | CN961812 | CN961836 | CN961860 | CN961816 |

# Table E-2 Wake Island
## Site 4: Pump Station # 9 Billeting and Community Area
### Volatile Compounds
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| EPA METHOD 601/602/624 | COLLECTION DATE | COLLECTION DAT | COLLECTION DAT | COLLECTION DATE |
|---|---|---|---|---|
| VOLATILE COMPOUNDS (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Benzene | <5 | <5 | <5 | <5 |
| Benzyl Chloride | <5 | <5 | <5 | <5 |
| Bromobenzene | <5 | <5 | <5 | <5 |
| Bromodichloromethane | <5 | <5 | <5 | <5 |
| Bromoform | <5 | <5 | <5 | <5 |
| Bromomethane | <5 | <5 | <5 | <5 |
| Carbon tetrachloride | <5 | <5 | <5 | <5 |
| Chlorobenzene | <5 | <5 | <5 | <5 |
| Chlorodibromomethane | <5 | <5 | <5 | <5 |
| Chloroethane | <5 | <5 | <5 | <5 |
| Chloroform | 10.6 | <5 | <5 | <5 |
| 2-Chlorethylvinyl Ether | <5 | <5 | <5 | <5 |
| Chloromethane | <5 | <5 | <5 | <5 |
| Chlorodibromomethane | <5 | <5 | <5 | <5 |
| Dibromomethane | <5 | <5 | <5 | <5 |
| 1,2-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,3-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,4-Dichlorobenzene | <5 | <5 | <5 | <5 |
| Dichlorodifluoromethane | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethane | <5 | <5 | <5 | <5 |
| 1,2-Dichloroethane | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethene | <5 | <5 | <5 | <5 |
| Trans-1,2-Dichloroethene | <5 | <5 | <5 | <5 |
| 1,2-Dichloroethene | <5 | <5 | <5 | <5 |
| 1,2-Dichloropropane | <5 | <5 | <5 | <5 |
| Cis-1,3-Dichloropropene | <5 | <5 | <5 | <5 |
| Trans-1,3-Dichloropropene | <5 | <5 | <5 | <5 |
| Ethyl Benzene | <5 | <5 | <5 | <5 |
| Methylene Chloride | <5 | <5 | <5 | <5 |
| 1,1,1,2-Tetrachloroethane | <5 | <5 | <5 | <5 |
| 1,1,2,2-Tetrachloroethane | <5 | <5 | <5 | <5 |
| Tetrachloroethylene | <5 | <5 | <5 | <5 |
| Toluene | <5 | <5 | <5 | <5 |
| 1,1,1-Trichloroethane | <5 | <5 | <5 | <5 |
| 1,1,2-Trichloroethane | <5 | <5 | <5 | <5 |
| Trichloroethylene | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane | <5 | <5 | <5 | <5 |
| 1,2,3-Trichloropropane | <5 | <5 | <5 | <5 |
| Vinyl Chloride | <5 | <5 | <5 | <5 |
| o-Xylene | <5 | <5 | <5 | <5 |
| p,m-Xylene | <5 | <5 | <5 | <5 |
| | | | | |
| SAMPLE NUMBER | GN961813 | GN961837 | GN961861 | GN961817 |

# Table E-3 Wake Island
## Site 4: Pump Station # 9 Billeting and Community Area
## EPA METHOD 625 - SEMI VOLATILE ORGANICS
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | COLLECTION DAT | COLLECTION DATE | COLLECTION DATE |
|---|---|---|---|---|
| EPA METHOD 625 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Acenaphthene | <5 | <5 | <5 | <5 |
| Acenaphthylene | <5 | <5 | <5 | <5 |
| Anthracene | <5 | <5 | <5 | <5 |
| Benzidine | <5 | <5 | <5 | <5 |
| Benzo(a)anthracene | <5 | <5 | <5 | <5 |
| Benzo(b)fluoranthene | <5 | <5 | <5 | <5 |
| Benzo(k)fluoranthene | <5 | <5 | <5 | <5 |
| Benzo(a)pyrene | <5 | <5 | <5 | <5 |
| Benzo(ghi)perylene | <5 | <5 | <5 | <5 |
| Bis(2-chloroethyl)ether | <5 | <5 | <5 | <5 |
| Bis(2-chloroethoxy)methane | <5 | <5 | <5 | <5 |
| Bis(2-ethylhexyl)phthalate | 98.1 | 8.4 | 11.1 | 50.2 |
| Bis(2-chloroisopropyl)ether | <5 | <5 | <5 | <5 |
| 4-Bromophenyl phenyl ether | <5 | <5 | <5 | <5 |
| Butylbenzylphthalate | <5 | <5 | <5 | 11.8 |
| 2-Chloronaphthalene | <5 | <5 | <5 | <5 |
| 4-Chlorophenyl phenyl ether | <5 | <5 | <5 | <5 |
| 2-Chlorophenol | <5 | <5 | <5 | <5 |
| Chrysene | <5 | <5 | <5 | <5 |
| Dibenzo(a,h)anthracene | <5 | <5 | <5 | <5 |
| Di-n-butylphthalate | <5 | 7.1 | <5 | <5 |
| 1,2-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,3-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 1,4-Dichlorobenzene | <5 | <5 | <5 | <5 |
| 3,3-Dichlorobenzidine | <5 | <5 | <5 | <5 |
| Diethyl phthalate | <5 | <5 | <5 | <5 |
| Dimethyl phthalate | <5 | <5 | <5 | <5 |
| 2,4-Dinitrotoluene | <5 | <5 | <5 | <5 |
| 2,6-Dinitrotoluene | <5 | <5 | <5 | <5 |
| Di-n-octyl phthalate | <5 | <5 | <5 | <5 |
| Fluoranthene | <5 | <5 | <5 | <5 |
| Fluorene | <5 | <5 | <5 | <5 |
| Hexachlorobenzene | <5 | <5 | <5 | <5 |
| Hexachlorobutadiene | <5 | <5 | <5 | Not Tested |
| Hexachlorocyclopentadiene | <5 | <5 | <5 | <5 |
| Hexachloroethane | <5 | <5 | <5 | <5 |

## Table E-3 Wake Island
## Site 4: Pump Station # 9 Billeting and Community Area
## EPA METHOD 625 - SEMI VOLATILE ORGANICS
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | | | | |
|---|---|---|---|---|
| Indeno(1,2,3-cd)pyrene | <5 | <5 | <5 | <5 |
| Isophorone | <5 | <5 | <5 | <5 |
| Naphthalene | <5 | <5 | <5 | <5 |
| Nitrobenzene | <5 | <5 | <5 | <5 |
| N-Nitrosodi-n-propylamine | <5 | <5 | <5 | <5 |
| N-Nitrosodiphenylamine | <5 | <5 | <5 | <5 |
| Phenanthrene | <5 | <5 | <5 | <5 |
| Pyrene | <5 | <5 | <5 | <5 |
| 1,2,4-Trichlorobenzene | <5 | <5 | <5 | Not Tested |
| 4-Chloro-3-methylphenol | <5 | <5 | <5 | <5 |
| 2,4-Dichlorophenol | <5 | <5 | <5 | <5 |
| 2,4-Dimethylphenol | <5 | <5 | <5 | <5 |
| 2,4-Dinitrophenol | <5 | <5 | <5 | <5 |
| 4,6-Dinitro-2-Methylphenol | <5 | <5 | <5 | <5 |
| 2-Nitrophenol | <5 | <5 | <5 | <5 |
| 4-Nitrophenol | <5 | <5 | <5 | <5 |
| Pentachlorophenol | <5 | <5 | <5 | <5 |
| Phenol | <5 | <5 | <5 | <5 |
| 2,4,6-Trichlorophenol | <5 | <5 | <5 | <5 |
| | | | | |
| SAMPLE NUMBER | GN961814 | GN961842 | GN961862 | GN961818 |

# Table E-4 Wake Island
## Site 4: Pump Station # 9 Billeting and Community Area
## EPA METHOD 608 PESTICIDES & EPA 615 HERBICIDES
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE | COLLECTION DATE |
|---|---|---|---|---|
| EPA METHOD 608 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| Aldrin | <0.40 | <0.20 | <0.20 | <0.04 |
| alpha-BHC | <0.30 | <0.15 | <0.15 | <0.03 |
| beta-BHC | <0.60 | <0.30 | <0.30 | <0.06 |
| delta-BHC | <0.90 | <0.45 | <0.45 | <0.09 |
| Lindane (gamma-BHC) | <0.30 | <0.15 | <0.15 | <0.03 |
| Chlordane | <0.14 | <0.70 | <0.70 | <0.14 |
| 4,4-DDD | <1.10 | <0.55 | <0.55 | <0.11 |
| 4,4-DDE | <0.40 | <0.20 | <0.20 | <0.04 |
| 4,4-DDT | <1.20 | <0.60 | <0.60 | <0.12 |
| Dieldrin | <0.20 | <0.10 | <0.10 | <0.02 |
| Endosulfan I | <1.40 | <0.70 | <0.70 | <0.14 |
| Endosulfan II | <0.40 | <0.20 | <0.20 | <0.04 |
| Endosulfan Sulfate | <6.60 | <3.30 | <3.30 | <0.66 |
| Endrin | <0.60 | <0.30 | <0.30 | <0.06 |
| Endrin Aldehyde | <2.30 | <1.15 | <1.15 | <0.23 |
| Heptachlor | <0.30 | <0.15 | <0.15 | <0.03 |
| Heptachlor Epoxide | <8.30 | <4.15 | <4.15 | <0.83 |
| Methoxychlor | <17.60 | <8.8 | <8.8 | <1.76 |
| Texaphene | <10 | <5.0 | <5.0 | <1 |
| Aroclor 1016 | <10 | <5.0 | <5.0 | <1 |
| Aroclor 1221 | <10 | <5.0 | <5.0 | <1 |
| Aroclor 1232 | <10 | <5.0 | <5.0 | <1 |
| Aroclor 1242 | <6.50 | <3.25 | <3.25 | <0.65 |
| Aroclor 1248 | <10 | <5.0 | <5.0 | <1 |
| Aroclor 1254 | <10 | <5.0 | <5.0 | <1 |
| Aroclor 1260 | <10 | <5.0 | <5.0 | <1 |
| | | | | |
| SAMPLE NUMBER | GN961812 | GN961836 | GN961860 | GN961816 |
| | | | | |
| EPA METHOD 615 (ug/L) | SAT, 31 AUG 96 | SUN, 1 SEP 96 | MON, 2 SEP 96 | TUE, 3 SEP 96 |
| 2,4-D | <1.2 | <1.2 | <1.2 | <1.2 |
| 2,4-DB | <0.91 | <0.9 | <0.91 | <0.91 |
| 2,4,5-T | <0.20 | <0.20 | <0.20 | <0.20 |
| Dalapon | <5.8 | <5.8 | <5.8 | <5.8 |
| Dicamba | <0.27 | <0.27 | <0.27 | <0.27 |
| Dichloroprop | <0.65 | <0.65 | <0.65 | <0.65 |
| Dinseb | <0.07 | <0.07 | <0.07 | <0.07 |
| MCPA | <249 | <249 | <249 | <249 |
| MCPP | <192 | <192 | <192 | <192 |
| Silvex | <0.17 | <0.17 | <0.17 | <0.17 |
| | | | | |
| | | | | |
| SAMPLE NUMBER | GN961815 | GN961839 | GN961863 | GN961819 |

# Appendix F

# Table F-1 Wake Island
## Site 5: Potable Water, Dining Facility
### Analyte Groups A, B, C, D, E, F, G, Volatile Compounds and TTHM
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | EPA METHOD 524.2 | COLLECTION DATE |
|---|---|---|---|
| GROUP A & B ANALYTES (mg/L) | TUE, 3 SEPT 96 | VOLATILE COMPOUNDS (ug/L) | TUE, 3 SEPT 96 |
| Chemical Oxygen Demand | 21 | Benzene | <5 |
| Oil and Grease | 0.4 | Benzyl Chloride | <5 |
| Total Petroleum Hydrocarbon | <1 | Bromobenzene | <5 |
| | | Bromodichloromethane | 15.9 |
| GROUP C ANALYTES (mg/L) | | Bromomethane | <5 |
| Ammonia | <0.2 | Carbon tetrachloride | <5 |
| Kjeldahl Nitrogen | 0.5 | Chlorobenzene | <5 |
| Nitrate/Nitrite | 0.26 | Chlorodibromomethane | 1.1 |
| • | | Chloroethane | <5 |
| GROUP D ANALYTES (mg/L) | | Chloroform | 110 |
| Cyanide, Total | <0.005 | 2-Chlorethylvinyl Ether | <5 |
| | | Chloromethane | <5 |
| GROUP E ANALYTES (µg/L) | | Dibromomethane | <5 |
| Phenols | <10 | 1,2-Dichlorobenzene | <5 |
| | | 1,3-Dichlorobenzene | <5 |
| GROUP F ANALYTES (mg/L) | | 1,4-Dichlorobenzene | <5 |
| Aluminum | <0.030 | Dichlorodifluoromethane | <5 |
| Antimony | <0.003 | 1,1-Dichloroethane | <5 |
| Arsenic | <0.005 | 1,2-Dichloroethane | <5 |
| Barium | <0.050 | 1,1-Dichloroethene | <5 |
| Beryllium | <0.001 | cis-1,2-Dichloroethene | <5 |
| Cadmium | <0.001 | Trans-1,2-Dichloroethene | <5 |
| Total Chromium | <0.010 | 1,2-Dichloropropane | <5 |
| Cobalt | <0.050 | Ethyl Benzene | <5 |
| Copper | 0.051 | Methylene Chloride | <5 |
| Iron | 0.045 | Styrene | <5 |
| Lead | 0.003 | Tetrachloroethylene | <5 |
| Manganese | <0.030 | Toluene | <5 |
| Mercury | <0.0002 | 1,2,4-Trichlorobenzene | <5 |
| Molybdenum | <0.030 | 1,1,1-Trichloroethane | <5 |
| Nickel | <0.020 | 1,1,2-Trichloroethane | <5 |
| Selenium | <0.005 | Trichloroethylene | <5 |
| Silver | <0.010 | Trichlorofluoromethane | <5 |
| Thallium | <0.001 | 1,2,3-Trichloropropane | <5 |
| Titanium | <0.050 | Vinyl Chloride | <5 |
| Vanadium | <0.050 | o-Xylene | <5 |
| Zinc | <0.050 | p,m-Xylene | <5 |
| | | | |
| Group G (mg/L) | | SAMPLE NUMBER | GP961885 |
| Acidity, Total | 2 | | |
| Alkalinity, Total | 42 | Bromodichloromethane | 16.7 |
| Alkalinity, Bicarbonate | 42 | Bromoform | <0.5 |
| Bromide | <0.1 | Chloroform | 134 |
| Chloride | 140 | Chlorodibromomethane | 1.3 |
| Residue Total | 197 | Trichloroflouromethane | 2.9 |
| Residue, Filterable (TDS) | 161 | Total Trihalomethane | 152 |
| Residue, Nonfilterable (TSS) | 3 | | |
| Surfactants | 0.14 | SAMPLE NUMBER | GP961888 |
| | | ON SITE ANALYSES | |
| | | pH (units) | 7.6 |
| SAMPLE NUMBERS | GP961844 | Temperature (°C) | 34 |

# Table F-2 Wake Island
## Site 5: Potable Water, Dining Facility
### EPA 625 Semi Volatile Compounds
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | | COLLECTION DATE |
|---|---|---|---|
| EPA METHOD 625 (ug/L) | TUE, 3 SEPT 96 | EPA METHOD 625 (ug/L) | TUE, 3 SEP 96 |
| Acenaphthene | <5 | 2,6-Dinitrotoluene | <5 |
| Acenaphthylene | <5 | Di-n-octyl phthalate | <5 |
| Anthracene | <5 | Fluoranthene | <5 |
| Benzidine | <5 | Fluorene | <5 |
| Benzo(a)anthracene | <5 | Hexachlorobenzene | <5 |
| Benzo(b)fluoranthene | <5 | Hexachlorobutadiene | <5 |
| Benzo(k)fluoranthene | <5 | Hexachlorocyclopentadiene | <5 |
| Benzo(a)pyrene | <5 | Hexachloroethane | <5 |
| Benzo(ghi)perylene | <5 | Indeno(1,2,3-cd)pyrene | <5 |
| Bis(2-chloroethyl)ether | <5 | Isophorone | <5 |
| Bis(2-chloroethoxy)methane | <5 | Naphthalene | <5 |
| Bis(2-ethylhexyl)phthalate | <5 | Nitrobenzene | <5 |
| Bis(2-chloroisopropyl)ether | <5 | N-Nitrosodi-n-propylamine | <5 |
| 4-Bromophenyl phenyl ether | <5 | N-Nitrosodiphenylamine | <5 |
| Butylbenzylphthalate | <5 | Phenanthrene | <5 |
| 2-Chloronaphthalene | <5 | Pyrene | <5 |
| 4-Chlorophenyl phenyl ether | <5 | 1,2,4-Trichlorobenzene | <5 |
| 2-Chlorophenol | <5 | 4-Chloro-3-methylphenol | <5 |
| Chrysene | <5 | 2,4-Dichlorophenol | <5 |
| Dibenzo(a,h)anthracene | <5 | 2,4-Dimethylphenol | <5 |
| Di-n-butylphthalate | <5 | 2,4-Dinitrophenol | <5 |
| 1,2-Dichlorobenzene | <5 | 4,6-Dinitro-2-Methylphenol | <5 |
| 1,3-Dichlorobenzene | <5 | 2-Nitrophenol | <5 |
| 1,4-Dichlorobenzene | <5 | 4-Nitrophenol | <5 |
| 3,3-Dichlorobenzidine | <5 | Pentachlorophenol | <5 |
| Diethyl phthalate | <5 | Phenol | <5 |
| Dimethyl phthalate | <5 | 2,4,6-Trichlorophenol | <5 |
| 2,4-Dinitrotoluene | <5 | | <5 |
| | | SAMPLE NUMBER | GP961886 |

# Table F-3 Wake Island
## Site 5: Potable Water, Dining Facility
## EPA METHOD 608 PESTICIDES AND EPA 615 HERBICIDES
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | | COLLECTION DATE |
|---|---|---|---|
| EPA METHOD 608 (ug/L) | TUE, 3 SEPT 96 | EPA METHOD 615 (ug/L) | TUE, 3 SEPT 96 |
| Aldrin | <0.04 | 2,4-D | Broke In Transit |
| alpha-BHC | <0.03 | 2,4-DB | Broke In Transit |
| beta-BHC | <0.06 | 2,4,5-T | Broke In Transit |
| delta-BHC | <0.09 | Dalapon | Broke In Transit |
| Lindane (gamma-BHC) | <0.03 | Dicamba | Broke In Transit |
| Chlordane | <0.14 | Dichloroprop | Broke In Transit |
| 4,4-DDD | <0.11 | Dinseb | Broke In Transit |
| 4,4-DDE | <0.04 | MCPA | Broke In Transit |
| 4,4-DDT | <0.12 | MCPP | Broke In Transit |
| Dieldrin | <0.02 | Silvex | Broke In Transit |
| Endosulfan I | <0.14 | | |
| Endosulfan II | <0.04 | SAMPLE NUMBER | GP961887 |
| Endosulfan Sulfate | <0.66 | | |
| Endrin | <0.06 | | |
| Endrin Aldehyde | <0.23 | | |
| Heptachlor | <0.03 | | |
| Heptachlor Epoxide | <0.83 | | |
| Methoxychlor | <1.76 | | |
| Texaphene | <1 | | |
| Aroclor 1016 | <1 | | |
| Aroclor 1221 | <1 | | |
| Aroclor 1232 | <1 | | |
| Aroclor 1242 | <0.65 | | |
| Aroclor 1248 | <1 | | |
| Aroclor 1254 | <1 | | |
| Aroclor 1260 | <1 | | |
| | | | |
| | | | |
| SAMPLE NUMBER | GP961884 | | |

# Appendix G

# Table G-1 Wake Island
## Site 6: Brackish Water, Near Laundry Facility
### Analyte Groups A, B, C, D, E, F, G, Volatile Compounds and TTHM
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | EPA METHOD 524.2 | COLLECTION DATE |
|---|---|---|---|
| GROUP A & B ANALYTES (mg/L) | SAT, 31 AUG 96 | VOLATILE COMPOUNDS (ug/L) | SAT, 31 AUG 96 |
| Chemical Oxygen Demand | 485 | Benzene | <5 |
| Oil and Grease | 0.3 | Benzyl Chloride | <5 |
| Total Petroleum Hydrocarbon | <1 | Bromobenzene | <5 |
| | | Bromodichloromethane | <5 |
| GROUP C ANALYTES (mg/L) | | Bromoform | <5 |
| Ammonia | 0.24 | Bromomethane | <5 |
| Kjeldahl Nitrogen | 0.6 | Carbon tetrachloride | <5 |
| Nitrate/Nitrite • | <0.1 | Chlorobenzene | <5 |
| | | Chlorodibromomethane | <5 |
| GROUP D ANALYTES (mg/L) | | Chloroethane | <5 |
| Cyanide, Total | <0.005 | Chloroform | <5 |
| | | 2-Chlorethylvinyl Ether | <5 |
| GROUP E ANALYTES (μg/L) | | Chloromethane | <5 |
| Phenols | <10 | Chlorodibromomethane | <5 |
| | | Dibromomethane | <5 |
| GROUP F ANALYTES (mg/L) | | 1,2-Dichlorobenzene | <5 |
| Aluminum | <0.030 | 1,3-Dichlorobenzene | <5 |
| Antimony | 0.011 | 1,4-Dichlorobenzene | <5 |
| Arsenic | 0.008 | Dichlorodifluoromethane | <5 |
| Barium | <0.050 | 1,1-Dichloroethane | <5 |
| Beryllium | <0.001 | 1,2-Dichloroethane | <5 |
| Cadmium | <0.001 | 1,1-Dichloroethene | <5 |
| Total Chromium | <0.010 | Trans-1,2-Dichloroethene | <5 |
| Cobalt | <0.050 | 1,2-Dichloroethene | <5 |
| Copper | <0.020 | 1,2-Dichloropropane | <5 |
| Iron | 0.093 | Cis-1,3-Dichloropropene | <5 |
| Lead | <0.020 | Trans-1,3-Dichloropropene | <5 |
| Manganese | <0.030 | Ethyl Benzene | <5 |
| Mercury | <0.0002 | Methylene Chloride | <5 |
| Molybdenum | <0.030 | 1,1,1,2-Tetrachloroethane | <5 |
| Nickel | <0.020 | 1,1,2,2-Tetrachloroethane | <5 |
| Selenium | <0.005 | Tetrachloroethylene | <5 |
| Silver | <0.010 | Toluene | <5 |
| Thallium | See Note | 1,1,1-Trichloroethane | <5 |
| Titanium | <0.050 | 1,1,2-Trichloroethane | <5 |
| Vanadium | <0.050 | Trichloroethylene | <5 |
| Zinc | <0.050 | Trichlorofluoromethane | <5 |
| **Note:** Due water type unable to analyze | | 1,2,3-Trichloropropane | <5 |
| Group G (mg/L) | | Vinyl Chloride | <5 |
| Acidity, Total | 4 | o-Xylene | <5 |
| Alkalinity, Total | 153 | p,m-Xylene | <5 |
| Alkalinity, Bicarbonate | 153 | | |
| Bromide | <0.1 | SAMPLE NUMBER | GN961873 |
| Chloride | 15010 | | |
| Residue Total | 37702 | ON SITE ANALYSES | |
| Residue, Filterable (TDS) | 29875 | pH (units) | 7.4 |
| Residue, Nonfilterable (TSS) | 96 | Temperature (°C) | 30 |
| Surfactants | 2.8 | SAMPLE NUMBERS | GN961872 |

# Table G-1 Wake Island
## Site 6: Brackish Water, Near Laundry Facility
### Analyte Groups A, B, C, D, E, F, G, Volatile Compounds and TTHM
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | EPA METHOD 524.2 | COLLECTION DATE |
|---|---|---|---|
| GROUP A & B ANALYTES (mg/L) | SAT, 31 AUG 96 | VOLATILE COMPOUNDS (ug/L) | SAT, 31 AUG 96 |
| Chemical Oxygen Demand | 485 | Benzene | <5 |
| Oil and Grease | 0.3 | Benzyl Chloride | <5 |
| Total Petroleum Hydrocarbon | <1 | Bromobenzene | <5 |
| | | Bromodichloromethane | <5 |
| GROUP C ANALYTES (mg/L) | | Bromoform | <5 |
| Ammonia | 0.24 | Bromomethane | <5 |
| Kjeldahl Nitrogen | 0.6 | Carbon tetrachloride | <5 |
| Nitrate/Nitrite | <0.1 | Chlorobenzene | <5 |
| | | Chlorodibromomethane | <5 |
| GROUP D ANALYTES (mg/L) | | Chloroethane | <5 |
| Cyanide, Total | <0.005 | Chloroform | <5 |
| | | 2-Chlorethylvinyl Ether | <5 |
| GROUP E ANALYTES (μg/L) | | Chloromethane | <5 |
| Phenols | <10 | Chlorodibromomethane | <5 |
| | | Dibromomethane | <5 |
| GROUP F ANALYTES (mg/L) | | 1,2-Dichlorobenzene | <5 |
| Aluminum | <0.030 | 1,3-Dichlorobenzene | <5 |
| Antimony | 0.011 | 1,4-Dichlorobenzene | <5 |
| Arsenic | 0.008 | Dichlorodifluoromethane | <5 |
| Barium | <0.050 | 1,1-Dichloroethane | <5 |
| Beryllium | <0.001 | 1,2-Dichloroethane | <5 |
| Cadmium | <0.001 | 1,1-Dichloroethene | <5 |
| Total Chromium | <0.010 | Trans-1,2-Dichloroethene | <5 |
| Cobalt | <0.050 | 1,2-Dichloroethene | <5 |
| Copper | <0.020 | 1,2-Dichloropropane | <5 |
| Iron | 0.093 | Cis-1,3-Dichloropropene | <5 |
| Lead | <0.020 | Trans-1,3-Dichloropropene | <5 |
| Manganese | <0.030 | Ethyl Benzene | <5 |
| Mercury | <0.0002 | Methylene Chloride | <5 |

# Table G-3 Wake Island
## Site 6: Brackish Water, Near Laundry Facility
## EPA METHOD 608 PESTICIDES AND EPA 615 HERBICIDES
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | | COLLECTION DATE |
|---|---|---|---|
| EPA METHOD 608 (ug/L) | SAT, 31 AUG 96 | EPA METHOD 615 (ug/L) | SAT, 31 AUG 96 |
| Aldrin | <0.04 | 2,4-D | <1.2 |
| alpha-BHC | <0.03 | 2,4-DB | <0.91 |
| beta-BHC | <0.06 | 2,4,5-T | <0.20 |
| delta-BHC | <0.09 | Dalapon | <5.8 |
| Lindane (gamma-BHC) | <0.03 | Dicamba | <0.27 |
| Chlordane | <0.14 | Dichloroprop | <0.65 |
| 4,4-DDD | <0.11 | Dinseb | <0.07 |
| 4,4-DDE | <0.04 | MCPA | <249 |
| 4,4-DDT | <0.12 | MCPP | <192 |
| Dieldrin | <0.02 | Silvex | <0.17 |
| Endosulfan I | <0.14 | | |
| Endosulfan II | <0.04 | SAMPLE NUMBER | GN961815 |
| Endosulfan Sulfate | <0.66 | | |
| Endrin | <0.06 | | |
| Endrin Aldehyde | <0.23 | | |
| Heptachlor | <0.03 | | |
| Heptachlor Epoxide | <0.83 | | |
| Methoxychlor | <1.76 | | |
| Texaphene | <1 | | |
| Aroclor 1016 | <1 | | |
| Aroclor 1221 | <1 | | |
| Aroclor 1232 | <1 | | |
| Aroclor 1242 | <0.65 | | |
| Aroclor 1248 | <1 | | |
| Aroclor 1254 | <1 | | |
| Aroclor 1260 | <1 | | |
| | | | |
| | | | |
| SAMPLE NUMBER | GN961872 | | |
| | | | |

# Appendix H

## H: Wake Island

Lead & Copper Building 1169
5-Sep-96

| | |
|---|---|
| | COLLECTION DATE |
| | THUR, 5 Sept 96 |
| GROUP F ANALYTES (mg/L) | |
| Copper | 0.233 |
| Lead | 0.014 |
| | |
| SAMPLE NUMBERS | GN961844 |
| | |

# Appendix I

## Table I: Wake Island
## Equipment Blank American Sigma SN 04132 Sampler
### Analyte Groups A, B, C, D, E, and F
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | | COLLECTION DATE |
|---|---|---|---|
| GROUP A & B ANALYTES (mg/L) | MON, 2 SEP 96 | GROUP F ANALYTES (mg/L) | MON, 2 SEP 96 |
| Chemical Oxygen Demand | <10 | Aluminum | <0.030 |
| Oil and Grease | NOT REQUESTED | Antimony | <0.003 |
| Total Petroleum Hydrocarbon | NOT REQUESTED | Arsenic | <0.005 |
| | | Barium | <0.050 |
| GROUP C ANALYTES (mg/L) | | Beryllium | <0.001 |
| Ammonia | <0.2 | Cadmium | <0.001 |
| Kjeddahl Nitrogen | <0.2 | Total Chromium | <0.010 |
| Nitrate/Nitrite | <0.1 | Cobalt | <0.050 |
| | | Copper | <0.020 |
| GROUP D ANALYTES (mg/L) | | Iron | <0.030 |
| Cyanide | <0.005 | Lead | <0.001 |
| | | Manganese | <0.030 |
| GROUP E ANALYTES (ug/L) | | Mercury | <0.0002 |
| Phenols | <10 | Molybdenum | <0.030 |
| | | Nickel | <0.020 |
| | | Selenium | <0.010 |
| | | Silver | <0.010 |
| | | Thallium | <0.001 |
| | | Titanium | <0.050 |
| SAMPLE NUMBER | BK961896 | Vanadium | <0.050 |
| | | Zinc | <0.050 |

# Appendix J

# Table J-1 Wake Island
## Equipment Blank Pitcher
### Analyte Groups A, B, C, D, E, F, G, Volatile Compounds and TTHM
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | | COLLECTION DATE |
|---|---|---|---|
| GROUP A & B ANALYTES (mg/L) | MON, 2 SEP 96 | EPA METHOD 601/602/624 | MON, 2 SEP 96 |
| Chemical Oxygen Demand | 15 | VOLATILE COMPOUNDS (ug/L) | |
| Oil and Grease | 0.6 | Benzene | <5 |
| Total Petroleum Hydrocarbon | <1 | Benzyl Chloride | <5 |
| | | Bromobenzene | <5 |
| GROUP C ANALYTES (mg/L) | | Bromodichloromethane | <5 |
| Ammonia | <0.2 | Bromoform | <5 |
| Kjeddahl Nitrogen | <0.2 | Bromomethane | <5 |
| Nitrate/Nitrite | <0.1 | Carbon tetrachloride | <5 |
| | | Chlorobenzene | <5 |
| GROUP D ANALYTES (mg/L) | | Chlorodibromomethane | <5 |
| Cyanide | <0.005 | Chloroethane | <5 |
| GROUP E ANALYTES (ug/L) | | Chloroform | <5 |
| Phenols | <10 | 2-Chlorethylvinyl Ether | <5 |
| | | Chloromethane | <5 |
| GROUP F ANALYTES (mg/L) | | Chlorodibromomethane | <5 |
| Aluminum | <0.030 | Dibromomethane | <5 |
| Antimony | <0.003 | 1,2-Dichlorobenzene | <5 |
| Arsenic | <0.005 | 1,3-Dichlorobenzene | <5 |
| Barium | <0.050 | 1,4-Dichlorobenzene | <5 |
| Beryllium | <0.001 | Dichlorodifluoromethane | <5 |
| Cadmium | <0.001 | 1,1-Dichloroethane | <5 |
| Total Chromium | <0.010 | 1,2-Dichloroethane | <5 |
| Cobalt | <0.050 | 1,1-Dichloroethene | <5 |
| Copper | <0.020 | Trans-1,2-Dichloroethene | <5 |
| Iron | <0.030 | 1,2-Dichloroethene | <5 |
| Lead | <0.001 | 1,2-Dichloropropane | <5 |
| Manganese | <0.030 | Cis-1,3-Dichloropropene | <5 |
| Mercury | <0.0002 | Trans-1,3-Dichloropropene | <5 |
| Molybdenum | <0.030 | Ethyl Benzene | <5 |
| Nickel | <0.020 | Methylene Chloride | <5 |
| Selenium | <0.005 | 1,1,1,2-Tetrachloroethane | <5 |
| Silver | <0.010 | 1,1,2,2-Tetrachloroethane | <5 |
| Thallium | <0.001 | Tetrachloroethylene | <5 |
| Titanium | <0.050 | Toluene | <5 |
| Vanadium | <0.050 | 1,1,1-Trichloroethane | <5 |
| Zinc | <0.050 | 1,1,2-Trichloroethane | <5 |
| | | Trichloroethylene | <5 |
| Group G (mg/L) | | Trichlorofluoromethane | <5 |
| Acidity Total | 2 | 1,2,3-Trichloropropane | <5 |
| Alkalinity Total | 4 | Vinyl Chloride | <5 |
| Alkalinity, Bicarbonatel | 4 | o-Xylene | <5 |
| Bromide | <0.1 | | |
| Chloride | 120 | SAMPLE NUMBER | BK961891 |
| Residue Total | <1 | | BK961892 |
| Residue , Filterable (TDS) | <1 | | |
| Residue, Nonfilterable (TSS) | 2 | | |
| Surfactants | 0.16 | | |

## Table J-2 Wake Island
## Equipment Blank Pitcher
## EPA METHOD 625 - SEMI VOLATILE ORGANICS
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| EPA METHOD 625 (ug/L) | COLLECTION DATE MON, 2 SEP 96 | EPA METHOD 625 (ug/L) Continued | COLLECTION DATE MON, 2 SEP 96 |
|---|---|---|---|
| Acenaphthene | <5 | Fluoranthene | <5 |
| Acenaphthylene | <5 | Fluorene | <5 |
| Anthracene | <5 | Hexachlorobenzene | <5 |
| Aroclor 1260 | <5 | Hexachlorobutadiene | <5 |
| Benzidine | <5 | Hexachlorocyclopentadiene | <5 |
| Benzo(a)anthracene | <5 | Hexachloroethane | <5 |
| Benzo(b)fluoranthene | <5 | Indeno(1,2,3-cd)pyrene | <5 |
| Benzo(k)fluoranthene | <5 | Isophorone | <5 |
| Benzo(a)pyrene | <5 | Naphthalene | <5 |
| Benzo(ghi)perylene | <5 | Nitrobenzene | <5 |
| Bis(2-chloroethyl)ether | <5 | N-Nitrosodimethylamine | <5 |
| Bis(2-chloroethoxy)methane | <5 | N-Nitrosodi-n-propylamine | <5 |
| Bis(2-ethylhexyl)phthalate | <5 | N-Nitrosodiphenylamine | <5 |
| Bis(2-chloroisopropyl)ether | <5 | Phenanthrene | <5 |
| 4-Bromophenyl phenyl ether | <5 | Pyrene | <5 |
| Butylbenzylphthalate | 6.2 | 1,2,4-Trichlorobenzene | <5 |
| 2-Chloronaphthalene | <5 | 4-Chloro-3-methylphenol | <5 |
| 4-Chlorophenyl phenyl ether | <5 | 2-Chlorophenol | <5 |
| Chrysene | <5 | 2,4-Dichlorophenol | <5 |
| Dibenzo(a,h)anthracene | <5 | 2,4-Dimethylphenol | <5 |
| Di-n-butylphthalate | <5 | 2,4-Dinitrophenol | <5 |
| 1,2-Dichlorobenzene | <5 | 2-Methyl-4,6-dinitrophenol | <5 |
| 1,3-Dichlorobenzene | <5 | 2-Nitrophenol | <5 |
| 1,4-Dichlorobenzene | <5 | 4-Nitrophenol | <5 |
| 3,3-Dichlorobenzidine | <5 | Pentachlorophenol | <5 |
| Diethyl phthalate | <5 | Phenol | <5 |
| Dimethyl phthalate | <5 | 2,4,6-Trichlorophenol | <5 |
| 2,4-Dinitrotoluene | <5 | | |
| 2,6-Dinitrotoluene | <5 | SAMPLE NUMBER | BK961893 |
| Di-n--octyl phthalate | <5 | | |

# Table J-3 Wake Island
## Equipment Blank Pitcher
## EPA METHOD 608 PESTICIDES AND EPA 615 HERBICIDES
Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| EPA METHOD 608 (ug/L) | COLLECTION DATE MON, 2 SEP 96 | EPA METHOD 615 (ug/L) | COLLECTION DATE MON, 2 SEP 96 |
|---|---|---|---|
| Aldrin | <0.04 | 2,4-D | <1.2 |
| alpha-BHC | <0.03 | 2,4-DB | <0.91 |
| beta-BHC | <0.06 | 2,4,5-T | <0.20 |
| delta-BHC | <0.09 | Dalapon | <5.8 |
| Lindane (gamma-BHC) | <0.03 | Dicamba | <0.27 |
| Chlordane | <0.14 | Dichloroprop | <0.65 |
| 4,4' DDD | <0.11 | Dinseb | <0.07 |
| 4,4' DDE | <0.04 | MCPA | <249 |
| p, p - DDT | <0.12 | MCPP | <192 |
| Dieldrin | <0.02 | Silvex | <0.17 |
| Endosulfan I | <0.14 | | |
| Endosulfan II | <0.04 | SAMPLE NUMBER | BK961894 |
| Endosulfan Sulfate | <0.66 | | |
| Endrin | <0.06 | | |
| Endrin Aldehyde | <0.23 | | |
| Heptachlor | <0.03 | | |
| Heptachlor Epoxide | <0.83 | | |
| Texaphene | <1 | | |
| Aroclor 1016 | <1 | | |
| Aroclor 1221 | <1 | | |
| Aroclor 1232 | <1 | | |
| Aroclor 1242 | <0.65 | | |
| Aroclor 1248 | <1 | | |
| Aroclor 1254 | <1 | | |
| Aroclor 1260 | <1 | | |
| | | | |
| | | | |
| SAMPLE NUMBER | BK96181891 | | |

# Appendix K

# Table K: Wake Island

## Reagent Blank

## Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | SULFURIC ACID | | HCL BLANK |
|---|---|---|---|
| | COLLECTION DATE | EPA METHOD 601/602/624 | COLLECTION DATE |
| GROUP A & B ANALYTES (mg/L) | MON, 2 Sept 1996 | VOLATILE COMPOUNDS (ug/L) | MON, 2 Sept 1996 |
| Chemical Oxygen Demand | 13 | Benzene | <5 |
| Oil and Grease | 0.4 | Benzyl Chloride | <5 |
| Total Petroleum Hydrocarbons | <1 | Bromobenzene | <5 |
| | | Bromodichloromethane | <5 |
| GROUP C ANALYTES (mg/L) | | Bromoform | <5 |
| Ammonia | <0.2 | Bromomethane | <5 |
| Kjeddahl Nitrogen | 0.6 | Carbon tetrachloride | <5 |
| Nitrate/Nitrite | 0.14 | Chlorobenzene | <5 |
| | | Chlorodibromomethane | <5 |
| GROUP E ANALYTES (ug/L) | | Chloroethane | <5 |
| Phenols | <10 | Chloroform | <5 |
| | | 2-Chlorethylvinyl Ether | <5 |
| GROUP D ANALYTES (mg/L) | SODIUM HYDROXIDE | Chloromethane | <5 |
| Cyanide | <0.005 | Chlorodibromomethane | <5 |
| | | Dibromomethane | <5 |
| SAMPLE NUMBER | BK961896 | 1,2-Dichlorobenzene | <5 |
| | | 1,3-Dichlorobenzene | <5 |
| | | 1,4-Dichlorobenzene | <5 |
| GROUP F ANALYTES (mg/L) | NITRIC ACID | Dichlorodifluoromethane | <5 |
| Aluminum | <0.030 | 1,1-Dichloroethane | <5 |
| Antimony | <0.003 | 1,2-Dichloroethane | <5 |
| Arsenic | <0.005 | 1,1-Dichloroethene | <5 |
| Barium | <0.050 | Trans-1,2-Dichloroethene | <5 |
| Beryllium | <0.001 | 1,2-Dichloropropane | <5 |
| Cadmium | <0.001 | Cis-1,3-Dichloropropene | <5 |
| Total Chromium | <0.010 | Trans-1,3-Dichloropropene | <5 |
| Cobalt | <0.050 | Ethyl Benzene | <5 |
| Copper | <0.020 | 4-Isopropyltoluene | <5 |
| Iron | <0.030 | Methylene Chloride | <5 |
| Lead | 0.036 | 1,1,1,2-Tetrachloroethane | <5 |
| Manganese | <0.030 | 1,1,2,2-Tetrachloroethane | <5 |
| Mercury | <0.0002 | Tetrachloroethylene | <5 |
| Molybdenum | <0.030 | Toluene | <5 |
| Nickel | <0.020 | 1,1,1-Trichloroethane | <5 |
| Selenium | <0.005 | 1,1,2-Trichloroethane | <5 |
| Silver | <0.010 | Trichloroethylene | <5 |
| Thallium | <0.001 | Trichlorofluoromethane | <5 |
| Titanium | <0.050 | 1,2,3-Trichloropropane | <5 |
| Vanadium | <0.050 | Vinyl Chloride | <5 |
| Zinc | <0.050 | | |
| SAMPLE NUMBER | BK961897 | SAMPLE NUMBER | BK961898 |

# Appendix L

# Table L: Wake Island

Trip Blank

Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| EPA METHOD 601/602/624 | COLLECTION DATE | EPA METHOD 601/602/624 Continued | COLLECTION DATE |
|---|---|---|---|
| VOLATILE COMPOUNDS (ug/L) | SUN, 1 SEP 96 | VOLATILE COMPOUNDS (ug/L) | SUN, 1 SEP 96 |
| Benzene | <5 | 1,2-Dichloroethane | <5 |
| Benzyl Chloride | <5 | 1,1-Dichloroethene | <5 |
| Bromobenzene | <5 | Trans-1,2-Dichloroethene | <5 |
| Bromodichloromethane | <5 | 1,2-Dichloropropane | <5 |
| Bromoform | <5 | Cis-1,3-Dichloropropene | <5 |
| Bromomethane | <5 | Trans-1,3-Dichloropropene | <5 |
| Carbon tetrachloride | <5 | Ethyl Benzene | <5 |
| Chlorobenzene | <5 | 4-Isopropyltoluene | <5 |
| Chlorodibromomethane | <5 | Methylene Chloride | <5 |
| Chloroethane | <5 | 1,1,1,2-Tetrachloroethane | <5 |
| Chloroform | <5 | 1,1,2,2-Tetrachloroethane | <5 |
| 2-Chlorethylvinyl Ether | <5 | Tetrachloroethylene | <5 |
| Chloromethane | <5 | Toluene | <5 |
| Chlorodibromomethane | <5 | 1,1,1-Trichloroethane | <5 |
| Dibromomethane | <5 | 1,1,2-Trichloroethane | <5 |
| 1,2-Dichlorobenzene | <5 | Trichloroethylene | <5 |
| 1,3-Dichlorobenzene | <5 | Trichlorofluoromethane | <5 |
| 1,4-Dichlorobenzene | <5 | 1,2,3-Trichloropropane | <5 |
| Dichlorodifluoromethane | <5 | Vinyl Chloride | <5 |
| 1,1-Dichloroethane | <5 | SAMPLE NUMBER | BK961899 |

# Appendix M

# Table M: Wake Island

Spike Samples

Wastewater Characterization Survey: 31 Aug - 3 Sept 1996

| | COLLECTION DATE | COLLECTION DATE | VALUE RANGE |
|---|---|---|---|
| GROUP A & B ANALYTES (mg/L) | SAT, 31 AUG 96 | SAT, 31 AUG 96 | |
| Chemical Oxygen Demand | 107 | 101 | 133-181 |
| Oil and Grease | 29.8 | 69.6 | 36-75 mg/bottle |
| Total Petroleum Hydrocarbon | 29.8 | 25.6 | No Value Range |
| | | | |
| GROUP C ANALYTES (mg/L) | | | |
| Ammonia | 6.6 | 7 | 2.42-3.34 |
| Kjeddahl Nitrogen | 8.3 | 7.6 | 5.74-8.26 |
| Nitrate/Nitrite | 4.56 | 4.56 | 3.88-5.24 |
| | | | |
| GROUP D ANALYTE (mg/l) | | | |
| Cyanide, Total | 0.214 | 0.2 | 0.183-0.319 |
| | | | |
| GROUP E ANALYTES (ug/L) | | | |
| Phenols | 230 | 230 | 0.190-0.310 |
| | | | |
| GROUP F ANALYTES (mg/L) | | | in ug/l |
| Aluminum | 0.635 | <0.03 | 486-700 |
| Antimony | 0.139 | <0.003 | 83.3-139 |
| Arsenic | 0.068 | <0.005 | 38.9-61.2 |
| Barium | 0.334 | <0.050 | 243-349 |
| Beryllium | 0.101 | <0.001 | 72.9-105 |
| Cadmium | 0.089 | <0.001 | 66.8-96.2 |
| Total Chromium | 0.253 | <0.010 | 189-271 |
| Cobalt | 0.624 | <0.050 | 456-656 |
| Copper | 0.504 | 1.47 | 367-529 |
| Iron | 0.164 | <0.030 | 86.9-144 |
| Lead | 0.497 | <0.020 | 353-507 |
| Manganese | 0.179 | <0.030 | 134-192 |
| Mercury | 0.006 | <0.0002 | 3.97-8.34 |
| Molybdenum | 0.233 | <0.030 | 132-244 |
| Nickel | 0.356 | <0.030 | 262-376 |
| Selenium | 0.091 | <0.005 | 134-210 |
| Silver | 0.099 | <0.010 | 72.9-105 |
| Thallium | 0.041 | <0.001 | 38.9-64.9 |
| Vanadium | 0.126 | <0.050 | 95.9-138 |
| Zinc | 0.531 | <0.050 | 389-559 |
| | | | |
| Group G (mg/L) | | | |
| Acidity, Total | 24 | 2 | |
| Alkalinity, Total | 43 | 6 | |
| Alkalinity, Bicarbonate | 43 | 6 | |
| Chloride | 60 | 31 | 20 mg/L |
| Residue Total | 539 | 472 | |
| Residue , Filterable (TDS) | 382 | 412 | 342 - 456 |
| Residue, Nonfilterable (TSS) | <1 | 56 | 23.2-30.8 |
| Sulfate | 0.1 | 2.6 | |
| | | | |
| SAMPLE NUMBERS | GN961889 | GN961890 | |
| LOT # WP1185 | LOT #3042 | LOT # 9961 | LOT # 9955 |
| | LOT # 9953 | | |
| TOTAL DISSOLVE AND | OIL & GREASE | CYANIDE | METALS |
| SUSPENDED SOLIDS | | PHENOL | |
| | | | |